MOVING AWAY FROM THE MOTOR VEHICLE:

The German and Hong Kong Experience

edited by
Harry T. Dimitriou

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Preface

It is very appropriate that the proceedings of this seminar should be published at this time given the renewed interest in possible ways of restraining motor car use in Hong Kong. The territory has, furthermore, recently embarked upon the world's largest programme of public works associated with the Port and Airport Development Strategy (PADS) of which road and rail transport is a significant component.

Hong Kong has also adopted a new Metropolitan Development Strategy (Metroplan) which is very much reliant upon this public works programme, and (among other things) is designed to raise the quality of life of its residents with the assistance of improved transport infrastructure and services. Complimenting PADS and Metroplan is a recent update of the Territorial Development Strategy (TDS), new environmental protection measures and revised town planning ordinances, all of which will have a significant bearing on the infrastructure proposals made.

If the growing international concern for the environment has any bearing on Hong Kong, then the environmental (and other) impacts of the large scale infrastructure proposals made for the Territory, particularly in terms of urban transport, warrant a 'second look'. By revisiting this area of concern in this publication, it is hoped to disseminate some positive new ideas and suggestions that come from different perspectives to those initially employed by Government.

The seminar reported upon here was in part conducted to provide an informal opportunity to look at such alternative perspectives. It sought to focus on a number of specific issues associated with transport and urban development - in particular, the role of the motor vehicle and the environmental concerns that are associated with any accommodation of its use. Drawing upon numerous international experiences, particularly the German experience, the seminar highlights lessons that can be learned from elsewhere, as well as errors that should be avoided.

Seminar participants were extremely fortunate to have the opportunity of learning at first hand, thanks to the Goethe-Institut, the experiences of Germany in its attempt to forge a new relationship with the motor car in urban areas. This experience was presented by two eminent professors brought over by the Institut especially for this event. The seminar was also attended by environmental experts from the USA and Canada, trans-

port specialists from the Government of Hong Kong, and many local academics and environmental specialists, many of whom are associated with Green Power - co-sponsors of the seminar.

The continental European experience is particularly interesting since Germany's neighbour - Holland - conducted a referendum which sought the views of the residents of Amsterdam as to whether the motor car should be banned from its city centre. Further afield, in Athens and Mexico City, where the motor car is a particularly important symbol of social status but where pollution levels associated with its use are extremely high, there has even been widespread volountary abandonment of motor vehicles on days when pollution levels are excessive.

In Australia, where large holes in the ozone layer have been reported, a heated debate is on-going as a result of research findings vis a vis the acceptable level of automobile dependence that city planners should be accommodating. Although Hong Kong clearly is privileged by having one of the most efficient urban public transport systems in the world, and a substantially smaller proportion of motor car owners in comparison to other world cites, it is opportune for this same debate to be held here. In this context, it is hoped that this publication will further stimulate such a debate.

Opening up a discussion of this kind in Hong Kong is especially welcomed, since traffic forecasts for metropolitan Hong Kong suggests that the city is about to experience a significant growth of private motor cars and goods vehicles. The White Paper on Transport Policy published in January, 1990, for example, projects a combined increase in private motor cars and motorcycles of 152% from 1986 (to 363,000) by the year 2001, and goods vehicles of 140% (to 202,000) for the same horizon date without measures to further restrict ownership and usage. The emission and broader environmental impacts of these increases, together with implications on urban form and other development goals, warrant discussion to ensure Hong Kong is moving forward in the right direction and learning from international experience.

Professor Wang Gungwu
Vice Chancellor
The University of Hong Kong

Foreword

Since the place where we live is no longer the place we work, this being a development which has intensified since the Industrial Revoultion, mobility has become an integral part of our modern civilisation. Ironically, however, this mobility is now partly restrained by the very same invention - the motor vehicle - which provides us with such dramatically enhanced mobility, freedom and independence. The daily traffic jams in our cities are proof of this.

Today, the issues are not merely those of mobility, traffic planning or public transport but are also concerned with the impact that the motor vehicle has on the environment, and on our health through traffic related air pollution, noise and accidents. This begs the question whether it will, as a result, be necessary to move away from the motor vehicle and find alternative means of movement or whether the adverse impacts of the motor car can be avoided?

The extent and complexity of the problems associated with this question calls for a multi-disciplinary approach. It is, furthermore, the policy of the Goethe-Institut to serve as a forum for the discussion of important issues of our time, to bring specialists from different fields together, and thus to facilitate the exchange of views and experiences which may be of mutual interest. On behalf of the Goethe-Institut, therefore, I would like to thank the University of Hong Kong, and specifically the Centre of Urban Planning and Environmental Management, for jointly organising the seminar 'Moving Away from the Motor Vehicle with both us and Green Power in April 1992. I also wish to thank Dr. Harry T. Dimitriou for all his efforts for making both the seminar and publication possible.

Uwe Nitshke
Director
Goethe-Institut
Hong Kong

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I am, of course, greatly indebted to the various contributors to the publication for finding the time to write the chapters in amongst their many other onerous tasks in academia, government and private practice.

I wish to acknowledge the assistance of Jenny Walker who provided invaluable editorial support, and to Oliver Trueb who undertook the desk-top publishing work and greatly assisted in the production of the manuscript and numerous tables and figures. The book cover was designed by Min Meenakshi Chandiramani of the Centre for Media Resources of the University of Hong Kong.

Harry T. Dimitriou
The University of Hong Kong
Hong Kong

Chapter 1:

Introduction

Simon S.C. Chau and Harry T. Dimitriou

Traffic and transport plays a vital role in peoples' daily life in the city, as it does in the economic and social well-being of a modern urban community. Air and noise pollution from road traffic, however, damages the inhabitants' physical and mental health, while inefficiencies in the transport system incur costs on both industrial as well as financial productivity.

Like most metropolitan areas of the world, Hong Kong is plagued by traffic problems: people sometimes fail to move around conveniently and comfortably, and their health and safety is threatened by motor vehicles. The majority of Hongkongers is, however, seemingly unaware of the cost the society is paying in this respect (especially the awaiting dangers and injustice involved), and the possible alternatives to currently pursued policies and resultant situations. Instead, regarding the motor car as the symbol of success and good living, and the provision of additional roads as the ultimate 'solution' to urban (especially freight) transport problems, they are somewhat stoic in the face of traffic jams and toxic fumes - accepting them as the inevitable cost of 'progress' and affluence. Such unfortunate ignorance is often inadvertently reinforced by certain government officials, politicians and the motor car industry, each for different reasons.

Some in the community, however, feel they have alternative more sustainable solutions to offer. They include academics, who by virtue of their access and exposure to international data and experiences, and theoretical ideas, feel able to offer alternative more enlightened ideas. Others in the community who feel they have something new to offer include environmentalists who share, and draw from, a rapidly growing knowledge base of researched 'green wisdom' provided by fellow campaigners and researchers around the world.

As Hong Kong heads towards the implementation of what some consider to be an ill thought-out transport policy, with warning signs manifesting themselves everywhere, voices with alternative ideas are begin-

ning to emerge. One happy occasion took place in April, 1992, when the Goethe-Institut of Hong Kong flew in two urban transport specialists from Germany, and, together with the Centre of Urban Planning and Environmental Management of the University of Hong Kong and Green Power (Hong Kong), held a one-day seminar with local and visiting scholars, green activists, government officials, public transport corporation managers, and public media representatives.

While it would be presumptuous to claim that there was a meeting of minds among those who attended the seminar - given the diversified backgrounds, outlooks and interests represented, and in light of the brief period of time available for the event - there was no doubt some sharing of information, widening of horizons, and exchange of views took place. This anthology is a based on the papers presented on that occasion. The fact that they cover a wide variety of themes related to city transport planning, representing two very different cultures and social realities, and presented on what Green Power consider to be the first serious discussion on alternative transport thinking ever to be held in Hong Kong, makes the text of this publication particularly useful and meaningful.

The first half of the book contains the German guests' contributions. They describe some non-traditional thinking in urban transport planning in their country, and the outcome so far of this kind of thinking. Professor Monheim begins in Chapter 2 by citing recent survey results in Germany to show how government planners and their policies are out of touch with the people's aspirations regarding the role of the motor car in cities, and why "trends need not automatically become destiny", suggesting 'traffic calming' techniques as practical responses to current city transport problems in Germany. Professor Retzko follows (in Chapters 3 and 4) by describing the latest ideas and initiatives in German urban traffic planning and public transport planning. Professor Monheim rounds up the German contribution with his accounts of 'cooperative urban traffic management' which attempts to maximize the utility of private motor cars and public transport in co-existence (see Chapter 5), and the success of pedestrianisation in German cities (see Chapter 6).

In the second half of the book, four Hong Kong transport and environment specialists, including two academics and two senior government officials, take it in turn to both introduce the local transport and environment scene in Hong Kong, and analyze problems behind them. Dr. Dimitriou (in Chapter 7) gives a critique of the government's current transport policy, and examines the relevance of other experiences elsewhere in the world to Hong Kong's present predicament. Dr. Barron

describes (in Chapter 8) the government's efforts in Hong Kong's transport sector "to slow the pervasive environmental degradation in a time of rapid growth" as well as upsurging expectations and personal disposable incomes. From Mr. Meakin, a person in government at one time responsible for bus public transport in Hong Kong, comes a historical account of the territory's public transport policy and an official overview of the present transport situation and its future (Chapter 9). Mr. Runnacles, also at one time with government, supplements this with a description in Chapter 10 of the world-wide re-birth of the tram (in the form of light rail transit), as well as its contribution to the local public transport system in Hong Kong. Dr. Dimitriou provides a further contribution in which he analyses the uniqueness of the Hong Kong transport scene and its inherent advantage in arriving at innovative transport planning responses when compared to other cities. He warns that failure to think and act imaginatively now will be a sad mistake - not only because the Hong Kong community will suffer badly as a result in the future, but also because a golden opportunity to contribute to the greening of Hong Kong - and (by example) other cities in China and the region - will be missed. Dr. Chau and Dr. Dimitriou briefly conclude with their observations and visions based on what was discussed in this seminar.

Part One:

The German Experience

Chapter 2:

Problems of Traffic Growth and Strategies for Traffic Calming: Perceptions Among Citizens and Opinion Makers

Rolf Monheim

Introduction

Traffic and transport planning for decades was, and in many cases still is, considered to be the domain of civil engineers, led by guidelines and models which are close to the certainty of natural science and (supposedly) free of values and ideologies. Meanwhile, it is increasingly acknowledged that traffic and transport planning have to do very much with values and policy-making. The official recommendations for traffic planning in Germany (see Forschungsgesellschaft, 1985a, and Monheim, 1989) are the best evidence for this.

One significant result of this new approach is the growing understanding among public transport agencies that it is not enough to offer good infrastructure in the technical sense of the term, but that their success depends very much on a favourable public awareness. This approach was developed in Germany by Werner Brög with his private consultancy 'Socialdata' in cooperation with many public transport agencies. From his work we now know a great deal about perceptions among citizens and opinion makers with respect to traffic both in many German cities as well as in other European countries (see Socialdata, 1989, 1990, 1991a-d, 1992).

When citizens were asked in Germany what in their opinion was the greatest problem that needed to be tackled by local politicians, traffic was mentioned most often by far (see Table 1) (1). German citizens living in urban areas are, furthermore, reported to feel that the quality of life in cities is greatly diminished by ever-increasing traffic growth, and especially by the dominance of motor car traffic.

Table 1: **Main Local Problems to be solved by the City Administration following Citizens' Opinion [%]**

	Munich	Nuremberg	Saarbrücken	Kassel
Traffic	42	43	47	31
Housing	24	15	2	2
Environment	17	6	14	15
Social	11	14	-	11
Economy / Labour	2	4	8	11
Others	14	18	29	29
Average Number of problems mentionned	3.0	2.2	1.9	2.3

Source: Socialdata, reports for public transport agencies 1988 / 89

The awareness of environmental problems in Germany among the public has grown enormously within the last few years. The quality of air in the city centre of Kassel in March 1989, for instance, was felt to be either 'bad' or 'rather bad' by 51% of those interviewed. One year later, this increased to 87%. In November 1990 the figure increased to 89% and by 1991, 86%. judged the air quality of Kassel to be bad. A majority (60 %) of the survey respondents claimed that politicians do not make enough effort to reduce pollution. They, furthermore, indicated that they increasingly considered motor car traffic to be the main cause of pollution (see Table 2), and as a result, most citizens proposed a reduction of motor car traffic as a remedy.

In Bayreuth citizens were asked whether traffic planners should build more streets to fulfil the needs of an inevitably growing motor car traffic or take measures to slow-down as much as possible the increase of motor car traffic by considering equally all modes of transport. The first alternative, which was the adoption of guidelines of traffic planning used for

Table 2: **Perception of Air Quality in the City Centre and Causes of Pollution by Citizen of Kassel [%]**

	March '89	March '90	November '90	June '91
(rather) good	49	13	11	14
(rather) poor	51	87	89	86
- due to car fumes	-	-	58	72
- due to industry	-	-	6	7
- due to heating	-	-	6	1
- don't know	-	-	19	6

Source: Socialdata 1991b, p. 4 / 5

decades, and still dominates transport planning practice in most cities of Germany (indeed the world), was preferred by only 27%. In families with children, the support for the motor car-oriented approach dropped to 24%; even in families owning a motor car it was supported only by a minority of 32% (Monheim, 1989).

German citizens, however, know that decision and opinion makers are reluctant to perceive people with a critical attitude. In Kassel, for instance, most citizens believe that politicians, journalists and members of the city administration believe that citizens are more motor car-orientated than they are in reality. Whereas, only a few hold that these people have a realistic idea of the general sentiment of the population in that they are in reality more hostile to the motor car (see Table 3). An opinion poll conducted in 1991 in different parts of Europe showed similar results for most European countries. A similar survey conducted during a motor car boom period in (what was) East Germany showed that 62 % of the citizens interviewed believed that politicians were more motor car-orientated than they.

The widespread support among citizens for more 'green modes' - that is public transport, cycling and walking - can be seen from Table 4 when asked to whom they would give priority if there were planning to overcome conflicts. In all cases, the green modes received overwhelming support. The case of Kassel, where the same question was posed within an interval of three years, shows that this support is still growing. This can be seen to be a result of intense discussion on traffic problems among the public and by the media, influenced by a strong public-awareness campaign. Meanwhile, Kassel has provoked controversial discussions because in the elections for the city council and the Lord Mayor in 1993,

Table 3: Perception of Citizens' Sentiments towards Motor Cars [%]

Citicens believe that politicians, jurnalists and administrators percieve citicens' sentiments towards motor cars to be...	Kassel politicians	Kassel journalists	Kassel administrators	GW politicians	GE politicians	EC politicians
... more hostile than they really are	27	23	31	30	22	24
... the same as they are	25	26	27	24	16	26
... more car friendly than they really are	48	51	42	46	62	50

GW: Germany - West
GE: Germany - East
EC: European Community

Source: Socialdata 1991b, p. 16 and 1992, p. 16

Table 4: Priority Preferred by Citizens in Case of Planning Conflicts between Motor Cars and Green Modes and the Perception by Opinion- and Decision Makers

	In the case of planning conflicts, notwithstanding disadvantages for car use, priority should be given to:		
	Public Transport	Cycling	Walking
Citizens of Nuremberg 1989	83	66	75
Citizens' vote as estimated by...			
... opinion makers	36	33	26
... public transport employees	57	-	
Citizens of Kassel 1989	74	54	
Citizens of Kassel 1989	93	78	89
Citizens of Germany West 1989	83	71	80
Citizens of Germany West 1989	91	77	84
Citizens European Community 1989	84	73	85
Citizens' vote as estimated by politicians	49	30	43

Source: Socialdata 1990, 1991c, 1992

the pro-motor car lobby gained a clear majority. A more detailed subsequent analysis, however, shows that this was not due to the citizens rejection of traffic calming but mainly to a wrong implementation of traffic calming schemes by the administration which not only made the pro-motor car lobby angry but also disillusioned and disappointed those in favour of traffic calming (Monheim and Holzapfel, 1993). Many of the latter did not go to the elections at all. After the elections, the support for traffic calming measures reached earlier heights of support.

Citizens of former East Germany, notwithstanding their widespread desire to buy a motor car as soon as possible, reacted to the prospect of an exploding motor car traffic growth by an even stronger support for green modes. It has therefore been argued that the support for green modes is heavily underestimated by local politicians (as in the case of Nuremberg), as well as by politicians throughout Europe.

Two lessons can be learned from the above experiences and many opinion polls with similar results. Firstly, that a change in the direction of transport planning is not impeded by citizen opposition but by small groups of opinion-makers and decision-takers (read politicians and bureaucrats). Secondly, that their reluctance may be attributed to their having a wrong perception of the growing public awareness and position regarding environmental problems, and their dependence on influential interest groups which still make their profits (directly or indirectly) from the motor car industry.

How Much Traffic Can be Avoided?

Traffic planning up to now has in most cases been based on the assumption of ever-increasing traffic growth, and the belief that this trend is both unavoidable and self evident if one looks at past statistical data. It should be pointed out, however, that this growth is neither inevitable nor a law of nature but the result of a self-fulfilling prophecy. In so far as this outcome is with us, it is only because planners react to every prognosis of growing traffic by creating additional infrastructures which then reinforces that growth, instead of making all efforts to avoid the prognosis to become reality.

What is instead needed is a 'traffic degeneration' approach, as it has been called by the late John Roberts, an English traffic researcher and consultant who started a large project in this direction (see TEST, 1992), the continuation of which unfortunately now seems to be threatened by his unexpected and untimely death in 1993.

Traditional traffic planning practises very much consist of efforts designed to speed-up motor car traffic and to eliminate traffic bottlenecks. The disastrous effects of the latter have been documented by a study in the Zürich-Region which reflects the common experience that new roads tend to generate an enormous additional traffic very soon after. (This was also very acutely noted in the case of the M25 outer-orbital road of London). The overall increase of motor car traffic in the Zurich-Region between 1985-88 was 1.5% per annum. In three traffic corridors, where links in the network of national roads had been closed after one year, there was a 22-45% increase in motor cars. After a further three years, this went up to 67%. The completion of all highway projects in the region were to generate between 1.3 and 2.3 million kms per day of additional motor car trips in the Greater Zürich-Region which negated all efforts made to reduce air pollution caused by motor cars (see 'Nationalstrassen', 1990).

These examples confirm the general experience of 'he who sows streets will harvest traffic'. On the other hand, in many cases where roads had been closed (mostly for pedestrianisation purposes) the predicted chaos did not occur, instead the total number of motor cars diminished considerably (as in the case of the city centre of Nuremberg). We can, therefore, argue that there is a contrary rule i.e., 'he who reduces street capacity will diminish motor car traffic also'.

The potential to increase or decrease traffic has been calculated carefully in several case studies in Germany. Socialdata has developed

scenarios showing how the choice of mode of transport depends a great deal on the transport policy of the city (see Table 5). Firstly, one has to state that there will be an increase in motor car use if traffic planning takes no action at all to curtail traffic growth. This is due to growing motor car ownership in Germany (especially among females), a decrease in household-size, an increase in the adult population, and increasing trip distances.

Secondly, if forecasted motor car use leads to an upgrading of the road infrastructure, this in turn will contribute to a further increase in motor car use. If, on the other hand, opportunities for public transport or (even better) all green modes of travel, including cycling and walking were improved, it would then be possible to reduce motor car use to the levels of the 1970s. The maximum difference in the share of trips made by the motor car between now and the 1970s is about 23%. Trips made by public transport could be increased twofold, and in a more suburban-type city which has a very low public transport ridership (such as Gladbeck), this could even be made to be three times as many.

Another example which shows the wide range of alternative trends in transport developments in Germany stems from the Berlin experience (see Kloas et al., 1992). Being the capital of Germany and by far the largest city in the country after unification, it is currently exposed to, if not endangered by, the high pressure of prevailing new real estate devel-

Table 5: Scenarios of the Transport Mode by 2000 According to different Transport Planning Strategies [%]

	Freiburg			Nuremberg			Gladbeck		
	car	pt	c/w	car	pt	c/w	car	pt	c/w
1982 [1]	39	11	50	(44)	(22)	(34)	48	9	43
1989	44	16	40	44	19	37	53	7	40
2000									
- trend	47	14	39	47	17	36	57	6	37
- car	55	11	34	53	15	32	67	4	32
- public transport	39	23	38	40	25	35	51	14	35
- green modes [2]	32	22	46	(30)	(30)	(40)	42	11	47

1) Nuremberg: 1976
2) Integrated planning approach, the shares in Nuremberg as the result of the political programme 'Leitbild Verkehr'.

car: driver, passenger or motorbike
pt: public transport
c/w: cykling or walking

Source Socialdata, Reports for the public transport agencies of Freiburg, Nuremberg and Gladbeck

opment interests. The Deutsches Institut für Wirtschaft (DIW) has developed two scenarios for Berlin showing the different effects of an increase in the population of the city by 14% between 1989 and the year 2010. In the 'laissez-faire' scenario, the population is estimated to grow within the city boundaries by only by 6.5%. Outside the Berlin city boundaries, however, it is estimated to grow by 44%. In the 'planned scenario' i.e., the scenario shaped by the proposed master plan and related planning guidelines, the population is to grow inside the city boundaries by 11.1%, and outside by 26.2%. As a consequence, the first scenario would result in a 103% increase in trip length driven by motor car users and a 6% decrease of miles travelled by public transport. The 'planned scenario' would slow-down the increase of distances driven by motor car users to 26%, whereas, trip distances travelled by public transport would increase by 44% (see Figure 1).

Possibilities for influencing transport development trends in a different direction do exist and are not exaggerations. This may be demonstrated by changes in Germany that have already taken place in the use of motor cars and green modes of transport where different policies have been introduced (see Table 6). Trends toward increasing motor car-use is strongest in cities without strong land use patterns. These are characterised by extensive urban sprawl, as in Saarbrücken and the cities in the Rhine-Ruhr-area (e.g. Essen, Wuppertal). There are, however, examples where it is still possible to arrest or even alter such trends, as in the cases of Hanover, Munich, Stuttgart and Zürich (in Switzerland).

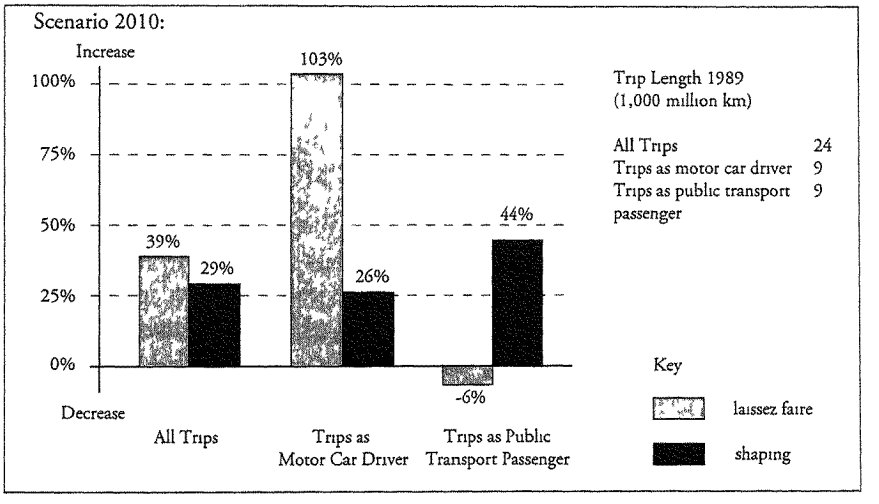

Figure 1: Changes in distances travelled in the Greater Berlin Area 1989 - 2010

Zürich is well known for its efforts to improve public transport. Even though it has always had a very strong public transport ridership, it was able to further increase that proportion within four years by one quarter to up to 42% of all trip-making. This is nearly twice as much as: Munich, the most successful but much larger German city (which has a 24% level),Stuttgart (with a 23% level of public transport patronage), and Hanover (which has a 22% public transport share). Public transport patronage levels in Germany during the 1960s and 1970s in most cases went down to very low levels. Freiburg, Hanover, Munich and Stuttgart, for example, show that it was possible however to reverse this trend. In heavily motor car-dependent cities, such as Essen, Saarbrücken and Wuppertal, on the other hand, the decrease of the public transport share still continues.

Table 6: Mode of Transport by Area [%]

		City			Region (w/o core city)		
	Year	m. car	pt	c/w	m car	pt	c/w
Aachen	1982	49	9	42	51	9	40
	1990	52	10	38	60	7	34
Essen	1976	41	17	43	-	-	-
	1990	53	15	32	-	-	-
Freiburg	1982	39	11	50	-	-	-
	1990	44	16	40	62	8	30
Hanover	1976	39	16	45	-	-	-
	1990	39	22	39	-	-	-
Munich	1976	44	19	37	-	-	-
	1982	39	22	39	-	-	-
	1989	40	24	36	-	-	-
Ruhr [1]	1988	51	13	36	61	7	32
Saarbrücken	1976	42	20	38	45		
	1989	54	17	29	66	8	26
Stuttgart	1976	48	16	36	-	-	-
	1981	43	21	36	-	-	-
	1990	43	23	34	-	-	-
Wuppertal	1976	39	22	39	-	-	-
	1982	48	12	31	-	-	-
	1990	54	17	29	-	-	-
Zurich	1984	33	34	33	44	20	36
	1988	29	42	29	-	-	-

1) Ruhr area: all core- and surrounding cities

m. car: driver, passenger or motorbike
pt: public transport
c/w: cykling or walking

Source: Socialdata; Reports for the public transport agencies of Freiburg, Nuremberg and Gladbeck

The main loser in all the above cases has been non-motorised traffic. The reported decline in walk trips throughout Germany has been so high that even increases in cycling have not made-up this loss of non-motorised travel. This is despite the fact that increases in cycle trips were considerable in some cases, as in Munich where the proportion of total trips made by bicycle increased from 6 to 12%, and in Hanover where it rose from 9 to 16%, and Freiburg where it increased from 15 to 18%.

The most critical traffic growth problems occur immediately outside large cities on their periphery. Public transport patronage in these areas have reached the lowest levels. Operators have been unable to alter the situation, even though there is an increasing awareness both by government and the public operators that this change is necessary and possible. The highly urbanized State of Saarland probably offers the worst example of public transport decline. Here, the share of trips made by the motor car grew among the adult population living outside the capital of Saarbrücken increased from 42% in 1976 to 61% in 1989; in addition to which there was a 11% increase in motor car passengers. This was due to a reduction of trips made by public transport from 9 to 5%, and a decline of walk trips from 35% to 20% (Socialdata, 1991a).

The results shown in Table 6 confirm the fact that trends need not automatically become destiny, and that perspectives for traffic reduction explained earlier in the scenario options are not utopian. The results suggest that if based on a decisive political will and the necessary financial support, such scenario options can become a reality. This outcome is particularly attractive to many city inhabitants who have called for action in this field (see, for example, several of the case studies collected by Apel, 1990).

Strategies for Traffic Calming

Traffic calming - which is the reduction of traffic growth in urban areas and settlements - requires operations in many different fields and on several different levels. It employs a hierarchy of goals similar to that for energy and waste saving. In this regard, one might be able to correspondingly refer to a superior goal of 'traffic saving'. Three basic strategies for traffic calming exist:

1. The avoidance of traffic by reducing the number and length of trips (comparable with reducing energy consumption and waste production).

2. The use, as much as possible, of the means of transport compatible with the livability of cities for non-avoidable trips (comparable with the preference for environmentally compatible energy resources and of re-cyclable materials).
3. The management of non-avoidable and replaceable motor car traffic in a way that its negative effects are minimized (comparable with the safest possible technique for power plants which use dangerous raw materials and the removal of unavoidable waste in the safest possible way).

Traffic calming can be compared with energy and waste saving measures in respect to the fact that the concept of saving resources is an important basis for welfare development and progress, and not, as those gaining from waste and consumerism always claim, a sign of regress and poverty.

Strategies of this kind are necessary not only for moving people but also for the transportation of goods. In the latter case, traffic growth ratios in Germany's urban areas have taken place at breathtaking levels. The negative effects of freight carrying modes - namely lorries and trucks - are much greater than their numbers suggest. There are, furthermore, a large number of structures and pollution impacts associated with the accommodation of motor vehicle freight movement, many of which are in part due to hidden subsidies and the artificially low cost of road transport operations. Although there is not enough space here to adequately discuss problems of goods transport and possible ways of how to reduce the road traffic it generates, cities such as Hong Kong and Singapore have paid special attention to this problem and offer lessons for Germany (see Stadtverträglicher Güterverkehr, 1989, and Verkehr aktuell: Güterverkehr, 1991).

Each of the above cited traffic calming strategies requires a wide range of measures in a great number of fields. Many of these measures depend on each other, and are both inter-related and have multiple feedbacks (see Heinze, 1979 and Vester, 1990). If transport problems are resolved independently, as is common in traditional traffic planning and engineering practice, this can have unexpected negative impacts on an adjacent area of concern. A typical example of this may be found in the construction of a major highway in parallel to a railway line. The former, in effect diminishes the potential viability of the railway service using the line. The rail links to Hong Kong's newly planned airport could well demonstrate this same effect.

While there is insufficient space here to explain all aspects of the three main traffic calming strategies employed in Germany, it is hoped that the following selective comments may give a better idea of how this approach can work. The German political perspective of the approach as it relates to the accommodation of walking and cycling needs are summarized by Monheim 1990; while a broad overview of traffic calming strategies is given by Heiner, Monheim and Rita Monheim-Dandosfer (1991).

Traffic Avoidance

The pursuance of traffic avoidance goals does not necessarily imply a reduction in transport mobility but rather a reduction in the efforts necessary to fulfil daily travel programmes. Much of urban travel activities have to do with the land-use configurations of settlements. In urban areas with high densities and a good mix of functions, one may find that many destinations can in fact be reached at short distances and several activities can be combined within one trip. Hongkong is a good example of a city that offers these advantages. Decentralised American cities, on the other hand, encourage maximum trip-lengths. These effects have been demonstrated in a recent publication using world-wide comparisons by Newman and Kenworthy (1989). In studies of Australia for Canberrra and Melbourne these same researchers have shown how urban consolidation strategies can also help to reverse such trends.

An important reason for the growing trip length distances has to do with the increase of driving speeds and the construction of better roads that also offer more comfortable motor car travel. As Heinze (1979) explained, confirmed by the data collected by Socialdata, the daily travel time in Germany is more or less equal among different areas. It does not, however, decrease if speed is increased. As a result, travel time savings made possible by technological progress are not used in other activities but instead to make longer trips.

This phenomena may be illustrated in drawing comparisons between Delft (Netherlands), a world-famous bicycle city, and Perth (Australia), an American-style motor car-dependent city (see Table 7). The number of trips is higher in Delft, the distances travelled are half the legth of the ones in Perth, but the travel time spent is equal. That means, the use of fast motor cars has increased neither mobility nor saved time for other purposes than travelling.

Table 7: Mobility and Mode of Transport in Delft and Perth

		Delft	Perth
Mobility (absolute figures)	Outings	1.9	1.6
	Trips	4.4	3.9
	Activities	2.4	2.3
	Trip length [km]	23	48
	Trip duration [minutes]	71	71
Mode of Transport [%]	Cycling / walking	65	17
	Motor Car	30	76
	Public Transport	5	7

Source: Socialdata

Another negative effect of a poor urban land-use mix and motor car-oriented transport infrastructure is the presence of a high (and in most instances statistically under-represented) amount of service trips, by which people unable to drive are brought to or taken from their various activities by motor cars: so that parents, for example, become taxi-drivers for their children and elderly.

Priority for the Green Modes

In the past few decades in Germany, large amounts of transport investment has been made in new road construction. The introduction of expensive rail or light rail systems in certain cities has then been counterbalanced by road building, especially in the Ruhr-area, the largest metropolitan region within Germany.

Investments in urban public transport have for a long period not been used to their full potential because of a lack of convenient services and an inadequate public awareness of the advantages of public transport use. German city dwellers instead ceased to perceive public transport as an attractive alternative to the motor car. Zürich, though, is the outstanding example for a new policy. It not only has an attractive public transport service which is used twice as much as in German cities of comparable size but it has created a civic pride whereby the city authorities actively promote its public transport services by claiming it to be the 'number one' in the Zurich transport system.

In Swiss cities, such as Zürich or Basel, it is as common to subscribe to a monthly 'environmental season-ticket' for public transport as it is to own a motor car. The priority given to public transport in these cities is reflected by receiving automatic green light upon approaching traffic lights and the restrictive parking policy for motor cars in the city centres.

The new awareness of a more self-confident role for public transport in German cities may be illustrated by the recent introduction of bus caps. Traditionally, bus stops in Germany used to be located in bus-bays, to avoid the banking-up of motor cars behind buses when they stopped to pick-up passengers, this is no longer the case. Before, the bus typically lost a great deal of time at the next traffic light when it had to queue up behind the vehicles that had previously passed it during its stop. To avoid this, an increasing number of cities in Germany have introduced bus-caps instead of bus-bays which oblige motor car users to spend the same waiting time as bus passengers.

This measure is not seen to discriminate against motor car drivers but rather to introduce equitable treatment of bus passengers and motor car users, whereby all arrive at the next traffic light in their original position. A good overview of the possibilities of revitalising public transit in German cities is given by Retzko (see Chapter 4) and also by Topp (1992).

Bicycles in Germany were re-discovered in the mid 1970s as an ideal means of transport in urban areas and as part of an increasing environmental awareness of the public to traffic problems. The Federal Government supported the use of bicycles by sponsoring a model cities programme which also received some support from State Governments. As a result of these efforts, it was possible in several cases to double bicycle-use within a few years. Bremen, Erlangen and Münster are the most famous bicycle-cities in Germany. For details of the bicycle planning approaches adopted in these cities the reader is referred to 'Programm fahrradfreundliche Stadt Münster' (Programme for a bycicle-friendly city of Münster, 1989). One element of this new trend shows that for commuters it is often very convenient to combine the use of a bicycle with rail ('bike and rail'). Dutch cities have started, and some German cities are following, in the building of large parking garages and service centres for bicycles at their main railway stations.

The promotion of bicycle-use, similar to public transport promotion, can only be successful if the appropriate convenient infrastructure is provided, and accompanied with public-awareness campaigns and restrictions to motor car-use. In this regard, the reduction of high speed motor car traffic is essential since this mode poses the greatest danger and impediments to an efficient and safe bicycle use in urban areas.

The introduction of two measures may enhance the safety of cyclists in a simple and cost-effective way. Firstly, at traffic lights an area in front of the motor cars may be reserved for to cyclists. When the traffic lights

are red, arriving cyclists can line up in that area. They then receive a green light several seconds before the motor cars so that they may cross the intersection first in all directions without being endangered by motor car traffic. This kind of priority scheme was first introduced in the Netherlands, where it is still more commonly found than elsewhere in Europe. Secondly, streets that are important for an urban biycle network and are of low significance for motor cars can be changed into 'bicycle-streets', where cyclists have priority and motor cars are allowed only for access only at a maximum speed of 20 km/h.

Pedestrian planning has not yet received the attention it deserves in Germany, primarily because walking as a mode of transport is highly underestimated (see Schwerdtfeger, 1979). In European cities, and much more so in Asian cities, it has to be understood that 'walking is transport' as Hillman and Whalley (1979) put it in their rousing book of the same title. Up until now, the attention given to pedestrians has more or less been restricted to city centres, where in Germany extensive pedestrian precincts have been developed (see Chapter 6 in this publication). In Hongkong, it may be observed that efforts at accommodating pedestrian movement are similar to the approaches adopted by some American cities such as Minneapolis and St. Paul, both of which have created sky-way pedestrian systems. The problem of walking along such systems, however, is that by taking pedestrians to separate (elevated) levels one is avoiding the main issues of motor car dependence and associated environmental quality implications. The needs of pedestrians can only be accommodated on the street itself as part of the third kind of traffic calming efforts referred to earlier.

Minimal Negative Effects of Motor Car Use

It is very unlikely that motor cars will disappear from our cities in the near future. However, it is possible to adapt the way motor cars are used in cities to make them more compatible to the needs of urban living and the environment. Efforts at making the motor car adapt in this way to the city have been described as 'taming the car'. In this context, there is a wide range of measures for traffic calming in the narrowest sense of the term (see Hass-Klau, 1992). The main purpose of such measures is to slow down the speed of the vehicle and to increase the drivers' attention to the situation surrounding him, yet at the same time maintain motor car accessibility. The main benefits of such an approach include: the reduction of noise and air pollution, and most importantly, the reduction in the number of people injured and killed by traffic accidents.

According to the recommendations of the League of German Cities (Deutscher Städtetag) inner city traffic speeds should be reduced to 30 km/h, except on major roads where 50 km/h are permitted. However, the Federal Minister of Traffic has not yet agreed to make such recommendations law. In 1990, after a five years test case period, the possibility of discretionary area-wide speed reductions (down to 30 km/h, except main roads) was introduced. This measure is now increasingly used in residential areas as well as within shopping areas that are still accessible by the motor car at 30 km/h - although this is still too fast. So in 1991, Federal Legislation introduced the possibility of limiting the speed in such streets to 20 km/h, and in special cases even to 10 km/h. In some cases, this has been applied to entire historic old towns (e.g. Dinkelsbühl). This regulation, however, still requires a separation between the sidewalk and carriageway parts of the road.

A more far-reaching possibility for traffic calming is the abolition of separated motor car road carriageways and equal rights for all means of transport. In such instances, pedestrians may use the whole street and children are allowed to play wherever they like, while the speed of motor cars and bicycles are slowed down to the speed of pedestrians (i.e., 7 km/hr legally and in reality 20 km/h). Measures of this kind again have been introduced first in the Netherlands. This is primarily due to the pressure of citizens deploring that their children could not safely play on the streets of Dutch Cities within residential areas. These measures are referred to as 'woonerf' which can be translated as 'residential precinct'. In Germany, this approach was introduced after extensive testings in 1980. In the Netherlands the 'woonerf' regulation is now quite common, whereas in Germany its use is still limited.

Traffic calming schemes are increasingly applied to shopping streets of small German towns. This is also a way to overcome retailers' opposition against pedestrianization. Planning guidelines for traffic calming recommend a maximum flow of 200 motor cars per hour. Several examples show that even 300 vehicles per hour do not create safety problems. Shoppers however feel disturbed at such levels of traffic (see Monheim, 1987, and Forschungsgesellschaft, 1985b). Area-wide traffic calming and its effects has been tested in six model cities in Germany. Both the planning study, and the 'before and after' surveys were financed and directed by three Ministries of the Federal Government (namely the Ministries of Traffic, Town Planning and Environment) together with their respective research agencies. The results have been widely discussed in Germany and published (see Bundesminister für Verkehr, 1992).

Conclusions

There is still a long way to go from where we stand at present regarding the current political understanding of our environment and sustainable development, and the role of transport within this, and how we use our resources, and the kind of ideas and ideals expressed by the Club of Rome in their seminal report entitled 'Limits of Growth' (1974). The idea of saving resources, instead of wasting them, should prevent the reduction of the future welfare of the world and instead secure a more promising and resourceful future. It is significant that Switzerland, one of the world's richest nations, is very appreciative of this viewpoint, and has taken particular steps to especially improve urban public transport.

Although many examples of traffic calming in cities display favourable outcomes, particularly regarding the quality of life, it needs to be appreciated that many impediments are encountered when attempting to introduce traffic calming schemes. Many of these arise from the fact that planning and expenditure decision-makers are still very much dominated by pro-motor car members of the German society who do not dare to violate in any significant way the interests of the motor car lobby. As a result, the measures that are taken are often ad hoc and typically poorly integrated with other measures.

Despite this, there is a growing awareness in Germany that additional roads only lead to a dead-end, namely more traffic congestion, and make motor car dependency more difficult to turn away from. This view is now held by a broad spectrum of bodies, including: federal, state and local governments; pressure groups organized at the federal level (such as the Bicycle Club [ADFC]); the environmentalist 'Verkehrsclub Deutschland' (VCD); as well as various other environmentalist associations and local citizen bodies.

Local public transport operators in Germany increasingly take a more active role in the approach, whereas the Federal Railways (which includes suburban rail), have attempted to distance themselves from the whole issue by seeking to shed regional responsibilities. Of all the concerns, the environmental dangers now seem to present the most striking and articulate arguments for a new urban transportation policy (see 'Emissionsminderung im Strassenverkehr', 1992). However, there is still a widespread tendency among government decision makers in Germany to underestimate the problems involved until it is all too late - hence, the importance of public awareness programmes in traffic planning and

calming. This constitutes one of the most promising aspects of a new approach to urban transport planning which should be further worked on intensely (see Fachgruppe FMV, 1989).

From an international point of view, especially with respect to developing countries with much lower levels of motor car ownership, one may ask whether anything can be learned from the German, or more general European experience? What can be concluded is that there are in fact, no simple recipes. Instead, there are only better orientations that help one to be aware early enough of the risks connected with a motor car dependent approach, and on the basis of this find an adequate direction for development. Saving resources instead of wasting them has to be the highest priority, for both more livable cities and more prosperous sustainable economies.

Notes

(1) In large cities (like Munich) the shortage of housing followed as the second most urgent local problem, in others environmental problems were cited.

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Chapter 3:

New Goals, Methods and Procedures in Urban Traffic and Transport Planning

Hans-Georg Retzko

Introduction

Urban traffic and transport anywhere in the world reflect the movement needs of persons and goods from one place to another. The prevailing traffic and transport systems in turn influence land use patterns and the structures of our cities and towns. Vice versa, specific land use patterns postulate special and specific prevailing traffic and transport systems.

Transport is a means to an end, and not an end in itself. Urban traffic is not generated of itself but has causes for its generation. Types, intensities and distributions of land use influence traffic volumes, as well as the means of the transport mode selected. The demand for urban travel requires transport capacities and structures to accommodate this traffic making up the settlements' transport systems. Such systems are pre-conditions for the development of various types, intensities and distribution patterns of urban land use (see Figure 1).

Whenever, and wherever, these relationships were not (or are not) properly considered, high levels of unexpected traffic and transport demand is typically generated, and transport routes become congested. In response to this, one then tries to resolve the symptoms of this development and look for causes which can be blaimed. In so doing, however, the real causes are often not identified or discovered and others blamed.

Urban physical planning in Germany, and elsewhere in the world, has had the opportunity to influence the future traffic and transport scene of our cities, as indeed have the decision-makers of our cities. However, both planners and policy makers have not utilised well these opportunities. Instead, through their inaction or inappropriate action they have prolonged the life of the traffic and transport problems.

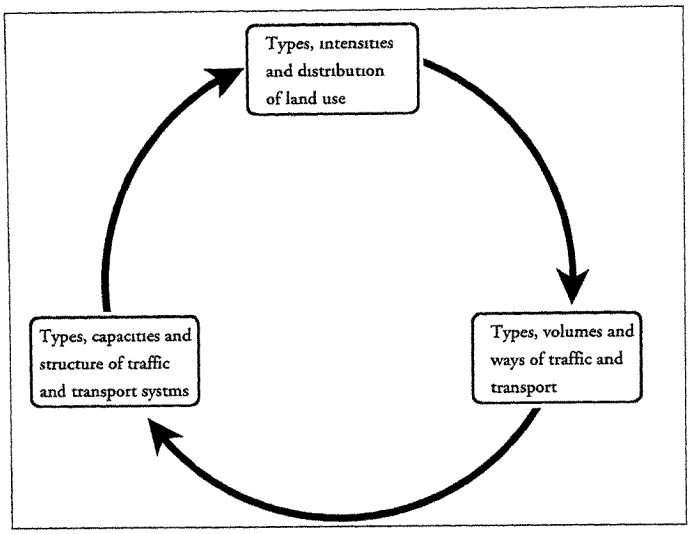

Figure 1 Influences on transport

The traffic congestion problems of German cities today are mainly caused by the large numbers of motor cars. So much so that motor car traffic dominates most German city centres. Nearly everyone in the country wants to drive a motor car. However, the price for doing this in terms of accidents, noise, air-pollution, land consumption, visual intrusions, traffic hindrances, congestion, stress etc. is very high. Furthermore, drivers of motor vehicles often behave anti-socially.

Against the above background (also elaborated upon elsewhere in this publication) the current traffic and transport problems of German cities are in dire need of measures which will improve the traffic situation. These need to be introduced as part of a sophisticated planning process which considers new goals and applies modern methods and appropriate procedures of traffic and transport planning.

Planning Process

We can define 'planning' as the systematic preparation and performance of decision-making processes oriented to the objective of creating a desired state. Planning is thus a goal-oriented activity. It has no beginning, and no end. Plans are, therefore, only documentations of specific momentary stages of the planning process and products of an on-going exercise with feedbacks (Forschungsgesellschaft, 1985) (see Figure 2).

The several fields of activity within the different planning stages in Figure 2 may be further differentiated, for example, by tests of environmental compatibility and/or of social compatibility. It is generally

believed today in Germany that the content of the old traffic and transport master plans were in most cases inadequate as an effective response to urban movement problems, particularly with respect to the methods and procedures applied. This is because they mainly addressed the needs and problems of motorised traffic. In former times, politicians, citizens and planners in Germany believed that the appropriate response to urban transport problems was one that planned and designed for more and better urban roads and streets. Today, that belief is no longer current.

Former traffic and transport master plans in Germany relied heavily on analytical investigations and, in retrospect, placed too much emphasis on traffic counts. The early traffic prognosis in many cases was only a

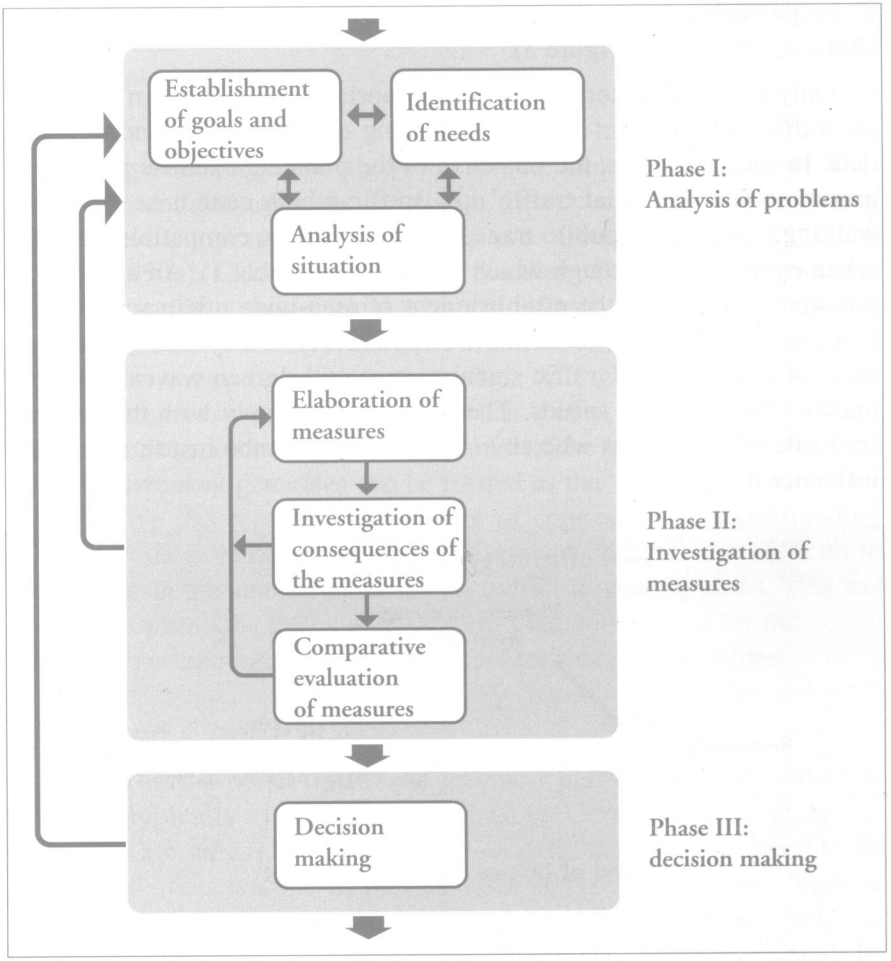

Figure 2: The planning process

representation that showed the mutual relationship of motorization and land use development. Later, this approach changed with the widespread use of computers so that subsequent preference was given to computing travel demand, travel matrices, modal split and traffic assignment. Creative and innovative planning, however, was seldom done.

More problematic than the above were the actual methods and assumptions used in the planning process. In accordance to the procedure of most areas within the field of civil engineering, traffic and transport engineers related their planning tasks and design work to given forecast data. The engineers in Germany, as elsewhere, considered traffic data as a given variable that they were obliged to accommodate. In retrospect, this was definitely wrong since traffic and transport planning needs to be performed on two different levels and in two different ways (Retzko, 1992a) (see Figure 3).

Only within the short term is it appropriate to plan, design and operate traffic and transport systems according to given traffic and transport data. In such instances, the objective of the planning exercise must be to accommodate 'essential traffic' i.e., traffic which cannot be shifted to walking, cycling, or public transport but which is compatible with the urban environment through which it passes (see Table 1). An approach if this kind can lead to the establishment of area-wide urban speed zones that limit traffic speeds to 30 km/h. Alternatively, it may lead to the operation of a coordinated traffic signal system with 'green waves' and with unconventionally low speeds. These measures comply with the generalized rule of economics whereby supply is used as the instrument which influence demand.

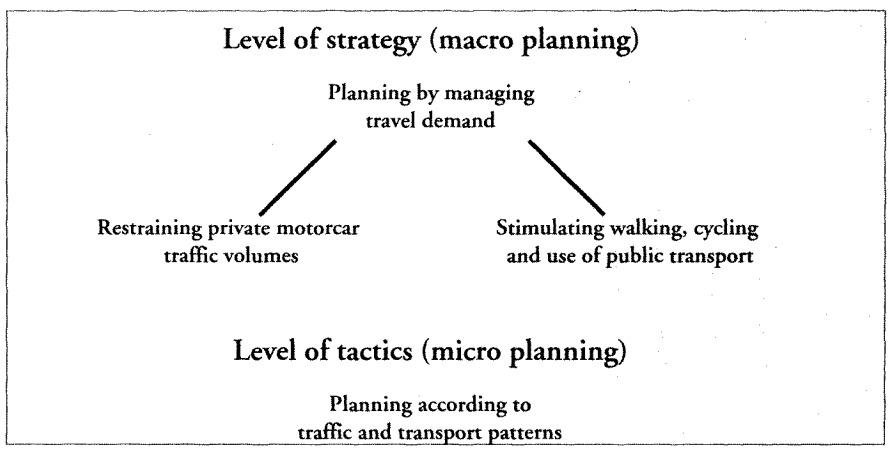

Figure 3: Level of strategy

compatible with the urban conditions	=	compatible with social requirements + compatible with environmental needs
compatible with social requirements	=	maximizing social advantages by guaranteeing necessary mobility and, simultaneously, minimizing social disadvantages by reducing restrictions, nuisances and dangers
compatible with environmental needs	=	minimizing environmental pollutions (land consumption, visual intrusion, energy consumption, noise, air pollution, etc)

Table 1: Essential traffic

Having introduced the above measures, one needs to define their acceptable and unacceptable effects on the social life and the environment according to specific local conditions (see Beckmann, 1991 and Retzko, 1992a). Generally speaking, Northern European city dwellers will judge traffic conditions and transport infrastructure to be compatible with the urban conditions, when pedestrians, cyclists and public transport predominate over private motor car traffic, or if there is the utmost minimum accommodation of private motor car traffic, whereby only 'essential' traffic is accommodated in city centres. The level of traffic that this kind of movement generates can be treated as the 'zero-level', while any traffic above this represents a measure of congestion. Notwithstanding this, it is clear from past experience in Germany that it is very difficult to pre-determine the amount of 'essential traffic' in general terms. This has to be done within the traffic and transport planning process for the city in question by a combination of political and technocratic decisions.

Goals and Conflicts

According to the urban traffic and transport planning process shown in Figure 2 typically employed in the past in German cities, goals and objectives are an essential part of the process and therefore need to be established. This is done in the 'analysis of problems' phase, together with the citizens and the politicians, in the form of a scientific-political consulting process. The initially established goals may subsequently be changed during the planning process. Generally, these goals change over

time and differ from locality to locality, because they are often based on specific interests.

It has, however, become very difficult to operate a consulting process of this kind in Germany at present. This is because both positive and negative effects of private motor car traffic are judged so differently by different groups. Many residents of a city are very much in favour of the motor car, others curse it. Interestingly, some motor car-owners are only fond of their own vehicle and not those of others. One must conclude from this, and other evidence, that the changing of values and attitudes of motor car owners do not necessarily correspond to rational individual behaviour, rather habits and even thoughtlessness.

According to the numerous goals of traffic and transport planning there is in fact a large variety of measures which can be applied. These range from the postulation of a drastic reduction of private motor car use by means of creating more pedestrian traffic-free areas, by better accommodating the needs of cycle traffic, and greater support given to public transport. This is, as opposed to, promoting private motor car traffic by building more in-city garages, parking facilities and roads and streets.

Many in Germany have placed their hopes on resolving urban traffic congestion problems on the greater use of 'intelligent technology'. However, many transport specialists point out that new technology alone cannot solve or even reduce these problems but must also involve the use of intelligent people. Traffic engineers and transport planners need to develop bundles of more goal-orientated transport policies and measures and apply these even if they could be unpopular. The public, considered intelligent, must accept such policies and measures, and accordingly respond positively to them. An example of a generalized goal-orientated transport planning system drawn from the German experience which seeks to become more compatible with its urban environment is shown in Figure 4.

While such an approach has to be modified according to the very specific local conditions in which it is applied, there are always conflicts inherent in such an approach that need to be resolved (see Figure 5). Such conflicts may arise, for example, between the goals of improving accessibility, on the one hand, and the cost effective operation of traffic and transport systems, on the other hand. Another conflict may be between goals of transport systems efficiency and the environmental quality of a city the system serves.

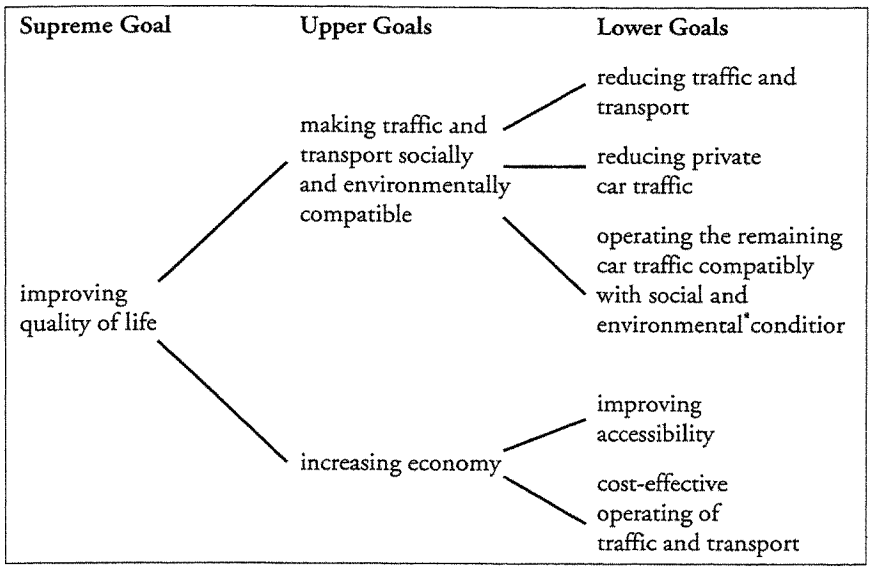

Figure 4: Level of goals

	Reducing traffic and transport	Reducing private motor car traffic	Operating the remaining car traffic compatible to social and environmental conditions	Improving accessibility	Cost effective operating of traffic and transport
Reducing traffic and transport		+	+	−	●
Reducing private motor car traffic	+		−	−	●
Operating the remaining motor car traffic compatible to social and environmental conditions	+	+		−	●
Improving accessibility	−	−	−		−
Cost effective operating of traffic and transport	●	●	●	−	

\+ Complementary − Compatible ● Divergent

Figure 5: Compatibility matrix

Traffic Management

As already indicated, measures for improving the traffic and transport situation of German cities are best if consistent with the goal-orientated planning system already stipulated. These measures need to form a combination of actions which better manage travel demand (see Topp et al, 1991 and Retzko, 1992b). They also need to try to restrain private motor car use (and thus traffic levels), simultaneously stimulating walking, cycling and the use of public transport. All these actions need to be pursued both at the level of transport strategy, as well as at the level of traffic management. As practical experience has already shown in Germany, stimulating the usage of public transport can only be effective if, at the same time, private motor car use is restrained. Regarding freight movement in urban areas, measures here need to be developed that shift towards greater rail use and water borne modes.

In support of the above outlined strategy and related measures, principles of the 'free market economy' should also be pursued whereby, whether driving a motor car or riding a public transport mode, the real price should be paid for urban travel. Appreciating that this is easier said than done, the most important aspect of a goal-orientated bundle of traffic and transport management measures is the realisation of its goals in the short term, and its immediate effectiveness in tackling the problems at hand. Furthermore, in relation to more grandiose responses, such management responses are comparatively cheap. Traffic and transport management is here defined as the re-organisation of traffic and transport in a physically existing system that more efficiently accommodates traffic movement at minimal cost. Potential traffic and transport management-measures as practised in Germany is given in general terms in Table 2. It is clear that nearly every mentioned measure needs to be discussed in greater depth if it is considered for a particular location or specific case.

Conclusions

Today's urban traffic and transport problems in the world cannot be 'solved' as such, but rather ameliorated to a level of compatibility acceptable to human beings and their environment. To attain this level of success, urban traffic and transport planning processes need to be applied in an integrated manner and in a way that incorporates inter-disciplinary thought and actions.

Urban traffic and transport planning must not only be goal-oriented but multi-faceted in the appriaches employed. All measures concerning

Table 2: Traffic Management Measures

Traffic management measures for passenger transport

Overall measures for all means of transport
- release closing times of shops
- staggering of working hours
- staggering of school hours
- public participation
- marketing

Pedestrian traffic
- more and larger areas for pedestrians
- pedestrian-friendly signal control
- safer ways to school

Bicycle traffic
- more and larger areas for cyclists
- cyclist-friendly signal control
- safer ways to school

Private motor car traffic

- increase of mineral taxes
- taxes for car ownership
- reduction of privileges for car users
- road pricing
- privileges for car pools (tax bonus or holidays for non-motorists)
- ramp metering
- control of access
- keeping car traffic out of urban areas
- area-wide parking control (residential parking, pay parking, limited parking duration, etc)
- reduction of private parking
- speed reduction
- traffic calming
- operating traffic control systems goal-oriented to socially and environmentally compatible car traffic (including restrictions on car traffic by signal control)

Public transport

- network integration of different transport systems (railways, express busses, busses, dial-a-ride-busses, dial-a-ride-taxis, etc)
- extension of routes to the surrounding areas (P+R, B+R, etc)
- higher frequency (time-tables)
- improvement of comfort
- exclusive lanes; bus sluices
- other promotion measures (including public transport-friendly signal control)
- improvement of the designing of vehicles and stops / stations
- improvement of information systems
- simplification of ticket machines

Freight transport

- market economy (competitive profit system)
- environmental taxes
- shfting freight transport from road to railway and ship
- hierarchical system of freight transport centres with different functions)
- improvement of road, railway and ship loading
- increase of pay load, especially for trucks
- more efficient terminals
- development of global logistic systems
- computer aided logistics
- promotion of co-operation between
- different transport systems
- urban truck routes
- partial or total control of access for trucks in urban areas
- restrictions for truck traftic at night

person movement have to rely less on private motor car use and more on walking, cycling and public transport modes. Once freight transport is also shifted from road to rail or water-borne vessels, only then will the quality of life in our cities be improved and our cities be protected in a better common future with the motor vehicle.

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Chapter 4:

New Developments in Urban and Suburban Public Transport

Hans-Georg Retzko

Introduction

In Germany, as well as in other European countries, public transport has a long tradition. There is a large variety of public transport means - both conventional and unconventional. The range of conventional transport modes in urban and suburban areas comprises taxis, buses, trolley-buses, trams, modern light rails, metros, and trains. Unconventional transport means, in most cases, are either organisational developments of classical modes, i.e. dial-a-taxi or dial-a-bus, or the so-called new public transport systems, such as waggons of different sizes, like a hanging or gliding horizontal lift, and others. The latter mentioned systems were developed in the 1970s especially in the US, Japan and West-Germany. Many politicians hoped at that time that these innovations would 'save' German cities from gridlock. Some technocrats and specialist consultancy firms promised a 'technological-fix' to the movement problems of Germany's urban areas. Other more enlightened traffic and transport specialists, have longtime argued that new high-tech 'solutions' would have very specific and only a few successful outcomes because of their high introductory and operational cost, as well as problems of acceptance, vandalism, visual intrusion and other problems typically associated with the introduction of these new technologies.

After many years of decreasing public transport usage in German cities, mainly because of the widespread use of private motor cars, public transport patronage has been increasing for some years now. This is so, however, only in the western part of Germany. In eastern Germany, where until unification public transport trips accounted for the largest share of all urban and suburban trips (due to very low fares and the low motorization rates at the time) levels of patronage have rapidly decreased to about 15% in 1990.

In general, the public transport share of all urban trips in Germany varies widely. The share depends on the size of the city, and on the time and purpose of travel etc. By and large the smaller the city in Germany, the lower the public transport share. This is so, despite the fact that it is now acknowledged widely that those cities which practice a more environmentally-sensitive approach to meeting their movement needs can call upon mounting evidence of remarkable results in attempts to increase the share of public transport.

Public Transit Federations

It was in Hamburg, in 1967, when the first public transit federation was set up in Germany. This far-sighted organisational entity was (and still is) responsible for the entire land and water based public and private public transport operations of the Hamburg Metropolitan Area (this includes the ferries). Among its tasks, the organisation (Hamburger Verkehrsverbund, HVV) prepares time-tables and harmonises tarrifs.

Today, in unified Germany with its 80 million or so inhabitants, about 45% of all Germans live in the country's thirteen metropolitan areas. These areas, which amount to about 15% of the total national area of Germany, are served by public transit federations. The biggest is the Rhine-Ruhr-Transit Federation (Verkehrsverbund Rhein-Ruhr, VRR). It has served seven million people since 1980 who live in 42 settlements within a total area of 5,000 km. Other well-known transit federations exist in the metropolitan areas of Hannover (since 1971), Munich (since 1972), Frankfurt (since 1974), and Stuttgart (since 1970). There are many other such federations and similar organisations in other urban areas, often offering lower levels of public transport integration. There is even public transit federations which cover different countries, as is the case of the Swiss-German border area.

Renaissance of Light Rail

Unfortunately, German public transport in urban and suburban areas are not profitable. This is despite (or perhaps because of) big investments in metro lines and regional railway systems, particularly in areas of Western Germany during the 1970s and 1980s. Public surface transport (i.e., bus, tram and light rail modes) carry a remarkable shares of all urban trips. In Hamburg, for example, such means of travel transports 44% of all trips; 42% in Frankfurt; and 39% in Munich. In most German cities of up to 300,000 inhabitants, buses and trams, or buses alone, are the only public transport means.

At the end of World War II, all German cities with more than 100,000 inhabitants had a close meshed network of trams. During the following two decades, however, most tram networks were abolished. As a result of motor car-oriented policies that were subsequently pursued by city governments throughout the country, urban public transport systems became more characterised by metro-systems (in the big cities) and bus systems (in the medium sized cities).

In city centres from the 1970s, however, the onslaught of the motor car was in retreat. German city centre surface areas was given back to pedestrians, cyclists, buses, trams and to both service and delivery vehicles. It is now (in the 1990s) felt that above-ground trams and light rail systems meet the movement needs of urban dwellers much better than the motor car. In the case of public transport operations, above-ground tram and light rail modes offer far better accessibility and penetration levels into city centres and, furthermore, appear much more popular with the public (see Chapter 10). The costs of such on-ground public transport services has in Germany been estimated to be only about ten per cent of underground systems.

The former abolitions and trimming down of tram networks in German cities are being replaced by the re-introduction and extension of tram and light rail transit systems. Such proposals were recently studied and introduced in Saarbrücken (200,000 inhabitants). Here, a transport study compared different public transport modes, such as a bus system, an advanced tram system, a mini-metro system, and a horizontal lift system. The tram system proved to be the most economically viable and was thus subsequently introduced. It was an option that was found not only to offer the best levels of accessibility but also seen as the most suitable mode to mold the future shape of the settlement.

Even in the biggest German cities, such as Berlin and Hamburg, tram systems are now being re-built. In the eastern part of Berlin, the tram survived many attempts to abolish them. Now plans are underway to extend the tram system from the eastern part of the city to the western part.

Another proposal for the operation of a new tram system was instigated in Karlsruhe, a town with approximately 500,000 inhabitants. Stations of the federal railways are located some 3-4 kilometres from the inner city. In order to develop the new tram system, the existing tracks of the federal railway and the tram lines within the city have been linked together. The rolling stock has the advantage of being able to operate with the two different electrical systems because it has dual current

engines. As a result, the tram system in Karlsruhe now serves the region as well as the city, including the main pedestrian mall area at the heart of the settlement.

Examples of New Developments in Surface Public Transport

On account of the widespread efforts to strengthen public transport in German cities, there is now a large variety of rolling stock and supporting developments of different kinds available. They extend from 'high-tech' technological developments to straighforward public transport management measures. To provide an insight into these kinds of developments currently underway in Germany, examples are given below of some recently introduced schemes, modes and management measures. Among other things, they demonstrate that public transport systems in Germany involve an extensive mixture of activities, as well as decision-makers, citizens and experts.

Low Floor Vehicles

Low-floor vehicles have recently been developed in Germany, both as buses as well as trams. The use of 'free wheel buggies' whereby the two facing wheels are not connected by an axle but driven by its own motor - allow for a low floor over the whole length of the vehicle. This not only reduces the noise of the vehicle but gives a smoother ride and increases the convenience of alighting passengers, especially the old and disabled, as well as mothers with prams,

Priority Programmes

Many priority programmes in Germany have been developed to speed-up the introduction of trams and buses in cities. In every case, such programmes consist of a package of measures, the most important and most effective therein being priority traffic light schemes, and buses lanes and bus sluices. With the newly introduced traffic lights, public transport can be either integrated into coordinated ('green wave') signal systems for private motor car traffic, or assign top priority to public transport by assigning an 'immediate green'. This ignores the green waves for motor car traffic.

By and large, there is a preference in German cities for the latter of the above schemes. It is considered environmentally more sensitive by its use of 'queuing management'. This scheme avoids queues of private motor car traffic in the city centre at traffic lights by producing queues at

lights on the periphery at non-environmentally sensitive locations. Bus and/or trams stops are also provided with parking facilities which encourage motor car drivers to park their vehicles and use public transport. Most Federal States in Germany provide financial assistance to such priority measures. One typical measure assigning priority to public transport in German cities is the improvement of tram lines to service the needs of 'express trams', called the ' Quick 6' in Darmstadt.

This improvement is aimed at greatly reducing the travel time of these vehicles, in part realised by altering the signal programmes at the intersections (by giving priority to trams) and by reducing the number of stops. The latter is possible in Darmstadt because of there being two other tram lines on the same route. 'Before-and-after Studies' in the city which investigated the effects of these measures showed that their introduction had positive impacts. For example, it was found that the number of passengers on this route could be increased by up to 25%. More important than this, were the qualitative effects the scheme had with respect to public awareness, many passengers interviewed in the study expressed their satisfaction with public transport more than ever before, citing 'speed', 'punctuality', and 'comfort' as the chief characteristics of the new 'express tram'.

Express Trains

An example of an applied public transport research in Germany which produced positive results was a study (directed by the author) of express buses and express taxi services in the country. This study found that express buses and express taxis in urban areas can in fact offer an attractive alternative to rail systems, especially for trip distances between 10-30 km, and even for distances of up to 50 km in some cases. This is primarily because they permit more flexible routes than the express railway (the S-Bahn).

To be competitive, however, such services need to offer similar or better quality features than the railway in terms of speed, operating cost, comfort and reliability. It has been demonstrated that express bus and taxis services can also be an attractive alternative to the private motor car if they possess direct connections to central area locations and/or to single destination points of regional and national significance. The study also established guidelines for planning and operating express bus and taxi public transport modes. These guidelines recommended standards for operations, travel times, routes and stops, schedules, tariffs, comfort, service as well as planning processes and project implementation.

Park and Ride

A second example of an applied research project conducted by the author was a study of park-and-ride schemes in German cities. It should be noted that the number of such schemes in Germany are in fact rather small. They include schemes in Hamburg and Munich. However, until now, many transport experts believed that park-and-ride could only function in large and densely populated urban areas where rapid rail systems exist. Despite this, more and more medium-size cities plan to introduce park-and-ride facilities at their peripheries, often planned as part of so-called 'cooperative traffic management' schemes. Large German automobile firms, in particular, have proposed and promoted park-and-ride schemes throughout the country. It has, though, become common opinion that park-and-ride will only function in close association with an area-wide urban parking policy and an acceptable quality of public transport.

The purpose of the second research project cited above was to elaborate a systematic planning procedure for the calculation of potential park-and-ride demand in German cities. It was initially decided to do this for commuter traffic only. In calculating this park-and-ride travel demand, it was necessary to consider the whole urban area, and not only specific park-and-ride localities. In this regard, the parameters used included: the size and importance of the city; numbers of commuters originating in different communities; characteristics of the public transport system; features of the road and street network; available parking facilities in the city; travel distances; times, costs; individual preferences, and others. Good results were obtained in the study for Frankfurt. It is now hoped to extend the 'procedure' to all traffic and transport planners in Germany and wider afield.

Student Tickets

There are many new developments in the field of public transport in German cities, the introduction of different ticket tariffs being just one such example. Many of these tickets were developed with attractive names. For example, the 'environmental ticket', allows a family of up to five persons to travel on one ticket during weekends, and at certain hours on weekdays. Alternatively, it can be used by different persons throughout the entire urban area. Another newly introduced ticket is the 'job-ticket' which is paid for by employers and results in the better usage of public transport by employees.

Similar to a job-ticket is the 'student ticket' which for the first time in Germany was applied in Darmstadt. Since the winter semester of

1991/92, the identity card of students of theTechnical University and of two High Schools in Darmstadt (altogether totalling 29,000 students) was used as the basis of issuing a ticket for students for all buses and trams of the Darmstadt Public Transport Company (HEAG) in the Darmstadt region. A token amount of only 14 DM had to be paid by every student for the whole semester (i.e., 2.3 DM per month). In addition to this, in the main quarters of the Technical University, an area-wide parking management scheme has been introduced which restricts persons who are not able to use public transport or for whom the use of public transport would be an unreasonable.

The result of the 'student ticket' project has been remarkable. Through comprehensive interviews conducted by the author it was found that the number of students who live in Darmstadt City and used public transport increased by almost 100%. While the number of students who live in the suburbs and used public transport was found to have increased by about 33%. The reduction of private motor car traffic among students in turn reflected this change of mode in preference to public transport. Needless to say, this development produced an important public relations boost for improved public transport services. Once again, it became evident that only a combination of attractive public transport and parking restrictions can produce effective diversions from the private motor car in favour of public transport.

Pedestrianisation and Public Transport

The pedestrianisation of city centres in Germany has a long tradition. In addition, nearly every German city or town has pedestrian zones. In many cases, these pedestrian zones also incorporate main tram or bus routes through the city. Pedestrians and public transport systems co-exist successfully in German cities, although of course, trams and pedestrians fit better together than buses and pedestrians. One is more easily alerted to a tram because it is on rails. They also have the advantage of not polluting the environment.

Bus-routes do not necessarily pose major problems in German cities if they use a clearly limited lane and small kerbs. As regards to capacity, more than 90 buses per hour can pass through a pedestrian zone (in two directions) with an operating speed of about 30 km per hour during shopping times, and about 50 km per hour during other periods. Normally the maximum speed of such vehicles in pedestrian zone areas is 7 km per hour.

Conclusions

The new developments in urban and suburban public transport in Germany reported here mainly refer to surface public transport modes. There has also been much progress in the field of underground public transport systems. Whatever the mode, the ultimate goal of public transport is to serve the needs of the individual traveller as much as possible, in order to reduce private motor car usage, and in turn, to better preserve the urban and global environment from adverse effects of motor car traffic. While many efforts have been made in this regard in Germany, using both improved transport hardware and software 'solutions', transport specialists know what needs to be done that has not been done. However, until politicians in Germany (as elsewhere) stop avoiding decisions that would create the necessary financial base for a drastic revision of public transport improvements, public transport alone cannot save our cities.

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Chapter 5:

Cooperative Urban Traffic Management

Rolf Monheim

Bias Towards the Motor Car and Resultant Deadlock

Traffic and transport planning in Germany has for a long time, and still is in many cases, primarily been oriented towards the construction of road infrastructure. A great deal of money and large amounts of scarce urban space has been wasted to this end because there has been no clear decision as to whether priority should be given to the private motor car or to public transport. Both modes still compete with each other, and as a result traffic conditions have become increasingly more chaotic and costly.

US cities decided to favour the automobile in preference to public transport since the 1950s. The motor car subsequently became a symbol of the American way of life. Public transport was neglected and thus levels of service deteriorated steadily, even in the most densely populated areas such as Manhattan, in New York. This was even more so in metropolitan areas like Los Angeles which initially had been established on a fine network of tramways. As more and more freeways were built in the Los Angeles area, vast parts of the city were rendered valueless, especially the densely populated inner areas.

Meanwhile, in the US as a whole, a growing realisation emerged that the transport policy paradigm that had been pursued for so long perhaps led to a 'dead-end'. One symptom of this has been the the revival of the streetcar in certain US cities, which for a long time had seemed totally anachronistic to the American way of life. Another suggestion that there is a growing acknowledgement of the need to pursue a different policy is the slow-down in the construction of new freeways in the face of stronger opposition to the motor car. A return to a 'more balanced' equilibrium between private motor car and public transport in American cities, however, will be very long and difficult; some may even argue that

it will be impossible to change direction as long as there is not a more widespread awareness of the deep crisis in transport and urban development that currently prevails.

Up to the 1970s, German traffic and transport planning practice followed the American model. As a result, increasing motor car ownership and growing trip distances resulted in ever growing traffic in urban areas. It seemed, unavoidable for cities to build new roads for their very survival. Even cities which in the late 1960s started the construction of subways simultaneously continued to increase their road and parking capacities.

From the early 1970s, numerous citizen protests in Germany forced transport planners and politicians alike to rethink their urban transport planning philosophy, and to reduce their highway construction programme. Meanwhile, traffic problems were considered by a large majority of city inhabitants as the most urgent problem confronting city administrations. While the slogan of the motor car lobby - 'free ride for free citizens' - symbolised the widespread belief in the unrestricted priority for motor cars, more recent opinion polls show a clear majority in favour of public transport priority. Meanwhile, other polls among planners and politicians showed that decision makers did not appreciate that such a change in public awareness had taken place (see Chapter 1).

Changing Tactics of the Motor Car Industry

At the end of the 1980s, the German car industry reacted to the increasing congestion on urban roads and to the resistance of citizens to the enlargement of the road infrastructures programmes in support of more motorised traffic. It did this by promoting the concept of 'cooperative traffic management'. The leading national motor car manufacturers - Daimler-Benz, BMW and VW - more or less simultaneously (but seemingly independent from each other) proposed new systems for a better use of existing road infrastructure, especially within urban areas.

The basis for their newly claimed responsibility in the field of traffic planning and management was that it did not make sense for them just to be concerned with the production of motor cars but how they were used as well, and where they can be best driven and parked. Each of the manufacturers, therefore, developed a pilot project for the capital of the state in which they had plants: Daimler-Benz in the Greater Stuttgart Area (its pilot project is called STORM i.e., Stuttgart Transport Operation by Regional Management); BMW in Munich (KVM i.e., Kooperatives

Verkehrs-Management); and VW in Hanover (the State Capital close to its plant in Wolfsburg). In both Stuttgart and Munich, the first steps have recently been taken to implement the new traffic management system proposed. Similar proposals have also been started in Cologne and Frankfurt (the latter under the direction of Professor Retzko). The new traffic management philosophy is based on two elements; namely: information technology and coordination in the use of the motor car and public transport.

Information Technology

The application fields of information technology are very broad. They include providing warnings in the case of traffic congestion or smog, detours, speed controls, parking availability and timetables of public transport. Certain information is provided on a location-specific basis, other information is intended to be received in a vehicle whilst mobile. Information technologies can also be used as part of a new system of automatic roadpricing for motor car drivers entering the city centre, for parking fees and for public transport ticketing. It is very evident that the electronics industry in Germany is very much interested in the transport sector (both at home and abroad). It is seen as a fast growing new and vast market for its products.

The motor car and electronic industries in Germany together currently participate in two research projects subsidized by the European Community: the PROMETHEUS Programme (a Programme for European Traffic with Highest Efficiency and Unprecedented Safety) and the DRIVE Project (a project of Dedicated Road Infrastructure for Vehicle Safety in Europe). Both projects aim at integrating the interests of industrial manufacturers, research institutions and public administrations. In reality, however, the projects are clearly dominated by the interests of industries involved.

The major difficulty with a technological approach to tackling current urban traffic problems is that it further sustains a situation which involves the dominance of the motor vehicle. In the opinion of certain critics, this is not compatible with aims and efforts at protecting the environmental quality of cities. This is particularly so, since the use of information technologies in the transport sector typically aims to increase the capacity of roads and their junctions so as to accommodate more traffic, as in the case of earlier traffic signal coordination systems such as GERTRUDE in Bordeaux, France.

Private Motor Car and Public Transport Coordination

Urban traffic management relying upon a systems approach has to do with exerting direct influence on transport demand and supply through organisational and operational measures that are communicated to potential travellers with the help of information. This is done with the aim of influencing trip patterns in advance of them taking place, with a view to making urban movement more efficient.

The most important innovation associated with this approach is the advanced insight it offers to both planners and travellers alike. The approach reflects the important fact that it is impossible to manage urban traffic just by addressing matters of transport supply, but that it is of crucial importance to also influence the demand for transport as well. In other words, the quantity of traffic, their trip lengths, and the choice of transport mode are all important factors to take into account in this effort to influence.

The main objective of traffic management should be to minimize traffic and recognise that transport is not an end in itself but rather a means to an end. The need to decrease motor car traffic in German cities has been accepted even by the country's motor car industry, although there are important differences of opinions and approaches as to how this might be achieved. Some of this difference of opinion has much to do with the division of labour, and the finances involved in the motor car and public transport industries, both of which are increasingly discussed by public transport operators.

The increased involvement in traffic planning of public transport agencies is a relatively new phenomenon in Germany. In former times, public transport operators were much more technically orientated in their approach. They restricted their attention and activities to optimising their own public transport system and to ensuring its financial viability. They did not appreciate that by doing this, notwithstanding the enormous investments made in the transport sector, their leadership in the transport arena had been decreased. In retrospect, the abolition in Germany of tram systems in favour of subways in large cities can be seen as a symbol of the self-isolation adopted by the public transport agencies, and the cession of the previously established public open space to the motor car.

In the mid 1980s, however, a change occurred in Germany among many public transport agencies, especially those in metropolitan regions. This change, in part, may be attributed to reduced funding but also to the changing climate of transport planning and policy in Germany at the time

which developed a more favourable view of public transport role. This new climate presented the public transport passenger as someone that had to be competed for, and won-over. This in turn required more information about his/her needs, preferences and perceptions, and a better insight into attitudes and use of the motor car as the main competing mode to public transport.

The new approach brought about many changes in organisational structures and marketing strategies of public transport agencies in Germany. As a result, many public transport enterprises in the country are now at last experiencing an increase in passenger patronage. This is important because, among other things, it demonstrates that it is possible to recapture the influential role of public transport in German cities. This also has far-reaching consequences for the way in which cooperative traffic management is understood and is interfaced with public transport operations.

One can distinguish two main approaches to urban traffic management in Germany. The first, uses traffic management as a means to maximize the use of motor cars and to better tackle chaotic traffic situations (the 'chaos management approach'). The second, uses traffic management as a means of avoiding traffic chaos by minimizing the dependence on motor car use, and facilitating motor car traffic that is essential for the functioning of the city.

The 'chaos management approach', if the term is not too simplistic, can be recognised from the many brochures and advertisements of the automobile and electronic industries. It is used when traffic flows are severely blocked and when transport demand heavily exceeds the provided road infrastructure capacity. In these situations, electronic information systems communicate to the motor car driver alternative routes to their destination or recommend driving to the next Park-and-Ride (P&R) station so as to continue the trip by public transport with an increased capacity to accommodate this additional patronage.

This above approach is too short-sighted for several reasons: Firstly, where trips have been started with a motor car, it is more likely that motor car drivers will hope that others will use P&R, and that they may complete their trips with less traffic on the roads. This is particularly likely as many motor car users in Germany typically have only a limited knowledge of public transport systems. They, therefore, have to overcome a major psychological barrier before transferring to public transport, and abandoning their motor vehicle. Only private motor car drivers

who are familiar with public transport would feel comfortable to take-up P&R options. This is not contradicted by recent findings in Munich where 90% of those interviewed indicated in a poll that they would change their private means of transport to public transport; they will do so only if they are accustomed to interchanging modes, something which until now has not been the case.

Another psychological barrier that motor car users need to overcome is the initial negative reaction to having to purchase and install an expensive information receiver in one's vehicle so as to benefit from the traffic management systems on offer. Purchasing such equipment is initially presumed to be costly. It is an investment that would make sense only if one could make more subsequent use of the motor vehicle as a result of the information obtained from the equipment, and not if the display merely suggested the need to make a mode transfer shortly before or after having started a motor car trip.

The availability of P&R schemes with additional public transport capacities for particular times of traffic congestion would require high investment. This is because urban public transport systems in Germany have no free capacity during peak periods of demand. It is at this time when traffic congestion on the roads is most likely to occur. In Munich, for example, the city's metro system is already crowded and well beyond its capacity. It is very unlikely, however, that the investments needed for the peak situations will be made available. This is true even the more because infrastructure which is used only during short peak periods results in high deficits (the same is true for peak periods of energy consumption). If that did happen, past complaints that public transport was uneconomical and requires too many subsidies would re-emerge.

On the basis of the above, only the second approach to cooperative traffic management can truly be justified in German cities. The requirements of such an approach have been prepared in a joint working group of the Association for Town, Regional and State Planning in Germany (SRL), together with the Munich Forum. They were presented at a conference organised by these two groups in January 1992 and addressed the following:

1. **The Need for an Integrated Approach** - Isolated traffic management and engineering measures, as employed up to now in Germany, have not been successful. A more comprehensive and integrated approach to traffic management is needed. In other words, one that has to consider techniques that favour public and private transport, as

well as preferred land use patterns, political and community preferences, and the right sequence of measures.

2. **The Need to Decrease the Attraction of Motor Car Use** - Traffic management measures alone cannot overcome congestion. This is because they make the use of the motor car, once again, more attractive. It thereby renders possible a higher number of person trips by car. Traffic management and transport strategies must, therefore, be developed to free traffic flows without encouraging more motor car use.
3. **The Shaping of Traffic Management to Achieve Higher Goals** - Traffic management efforts for motor cars need to be shaped and modified according to higher goals and policies of transport and urban development. Decreasing traffic volumes is of the highest priority, especially by means of minimising trip distances and avoiding 'service trips' accompanying other persons (as in the case of mothers acting as taxi drivers for their children). A second priority is to ensure that unavoidable trips (i.e., 'essential trips') are made by the 'green modes' (i.e., walking, cycling and public transport). The remaining motor car traffic has to be managed in a way which is compatible with maintaining a good environmental quality of the city, especially with regard to traffic speed limits and less motor car oriented street design, even on primary roads.
4. **Ensuring Public Transport Priority** - Massive improvements of public transport are seen as an inalienable condition for cooperative traffic management. They have to be introduced in anticipation of improvements for motor car use. This includes their financial priority.
5. **The Provision of P&R Terminals Compatible with Land Use Developments** - Access to subway and suburban railway stations cannot be given first priority to P&R users. This is because it contradicts other goals of localising stations at city centres with a higher density of living, working and residence. Public transport passengers are mainly expected to walk, cycle or come by feeder bus to the stations. These preferred conditions would be impeded by the introduction of the kind of P&R terminals proposed around Munich with approximately 5,000 parking lots. Only in areas with very low population densities should P&R be advocated as a reasonable way of accessing public transport for a considerable proportion of passengers.
6. **The Definition of Efficiency** - In the face of 500,000 motor vehicles entering the city boundaries of Munich daily, one has to ask how

many of these vehicles will be diverted by P&R and attracted to the public transport system as passengers, and at what price? How much less, furthermore, will the public suffer from the resultant traffic conditions, and will there be a relevant reduction?

7. **The Provision of Proof of Environmental Compatibility for P&R Terminals** - The construction of large P&R terminals around Munich has been proposed mainly for traffic approaching the city on federal freeways. Thirty such terminals, with a total capacity of 5,000 vehicles each, are envisaged. Implementing these proposals would require about 375 ha of building area, excluding access roads. If they were combined with service and retail centres, as has been proposed by some interest groups, additional space would be needed and, even worse, more motor car traffic would be generated. There are, therefore, significant doubts that these new functions and terminals would be compatible with the existing urban land-use planning arrangements for Munich and current environmental standards. In any event, a thorough planning process would have to be embarked upon with intense citizen participation.

8. **Parking Management as a Pre-condition for Traffic Management** - The intended reduction of motor car traffic in areas with the highest traffic pressure is only feasible if parking is also provided and managed according to pre-set planning requirements. Parking in public open spaces (i.e., on-street or off-street parking areas) should be permitted only if this does not endanger the quality of the surrounding environment. While the provision of spaces ought to be restricted to residents and service-related delivery vehicles and, to a lesser degree, to shoppers and other short term visitors - commuters must be excluded. Parking fees should reflect the demand for spaces, with their level varying according to both the location of the parking site and the daily pattern of the demand. A high proportion of motor car traffic within German city centres is in fact generated by the search for a parking facility. Often, motor car drivers pass by half empty parking garages without entering them because they dislike (for one reason or other) those particular garages or because they hope to find a more convenient parking facility elsewhere, often an illegal one. Electronic guide systems could help to reduce this kind of traffic. Information on the parking situations of each garage should be combined with information about public transport services. Motor cars should be parked as peripherally as possible. The best location is in the home garage! No additional parking facilities would then need to be built. When long-

term parking needs of commuters are changed into short term parking needs, the number of lots can then be decreased so as to avoid the encouragement of further traffic due to the higher turnover rate of vehicles using the same space.

9. **Financing Traffic Management** - All ideas for cooperative traffic management presented by the industrial lobby have up until now left open the financial viability issue of their proposals. In Munich, for instance, the proposed construction of the P&R terminals referred to above would cost between two and five thousand million DM; this does not include the upgrading of the public transport services necessary to make these terminals work. Proposals of the city municipality for improving public transport, on the other hand, would cost about two thousand million DM. Many public transport agencies in Germany have already introduced information systems as a means of improving their services and operations. These systems can be made more valuable if there was also the political will to be more decisive in restraining traffic in city centres.

Conclusions

The necessity of cooperative traffic management is stressed by nearly all groups concerned with urban transport in Germany, notwithstanding the fact that there are marked differences as to the way this should be done. The motor car and electronic industries, together with the German state and federal authorities, the European bureaucracy, as well as conservative politicians, all emphasise technical solutions that give an impression that severe restrictions on the use of the motor car can be avoided. These approaches are by and large extremely expensive. However, if the past is any indicator for the future, notwithstanding other public declarations, it has always been easier to find funds for the needs of the motor car rather than for 'green modes'.

The enthusiasm for traffic management of the above cited groups is not, however, shared to the same degree by the city authorities in Germany and their public transport agencies. The position of the latter is understandable given that in Munich, for instance, the need to increase its capacity and service levels was widely recognised for many years but the funding was not forthcoming. Whereas, during the same period a demonstration project for a highway information system on the most heavily congested access route from the north was financed without any problem.

German cities still encounter considerable difficulties with even simple decisions, even where money is available. In the case of Berlin, for instance, the city does not charge any parking fees for on-street parking. In Munich, its conservative politicians abolished parking meters ten years ago in response to 'popular demand'. Meanwhile, the introduction of high parking fees has been decided by the new city council. The administration, however, was very slow in installing the meters and reluctant to put into place the necessary enforcements.

The emphasis on technical solutions for traffic management seems to have arisen from a reluctance by the political parties to make firm decisions which will affect motor car drivers, and ultimately the industries which produce and sponsor them. The concept of an area-wide traffic-calming policy in the centre of Munich presented by BMW(see following Chapter), as part of its cooperative traffic management campaign, seemingly tells another story. However, if the political allies of BMW simultaneously block every proposal which would reduce the number of motor cars in the central area of Munich one wonders how much sense BMW's proposals make.

Without any doubt there is a need for more cooperative traffic management, and the support for this does exist among the inhabitants of Munich. It appears, however, that the politicians lack the ability (or will) to take the necessary decisions. Important progress could be made in many cases without even spending a great deal of additional money by just shifting the emphasis of the city's transport policy more in favour of 'green modes'. In Switzerland, referenda among its citizens have led to such an approach as witnessed by the policies currently pursued by Zürich and Basel. Among other things, what can be learned from these two cities is that enormous benefits can be obtained by not wasting public funds on the motor car, even in the richest of societies. This lesson in Germany has been learned in the field of energy saving and waste avoidance. In the field of urban transport, however, the lesson has yet to be learned.

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Chapter 6:

From Pedestrian Zones to Traffic Calmed City Centres

Rolf Monheim

Pedestrian Precincts as a Way of Life

Pedestrianisation has changed the central areas of Germany cities during the last three decades in a very spectacular way. Germany is in fact one of the leading countries with regards to the development of pedestrianisation in urban areas. This is reflected in the large, and still increasing, number of pedestrian precincts being introduced to its cities. There are, without doubt, now more than 2,000 such areas in Germany, although in reality no one knows the exact number.

In several cities, the pedestrian precincts are surrounded by areas where motor car access is greatly restricted. This suggests pedestrianisation has changed from the original concept of a limited mall to an element of area-wide traffic calming throughout the urban core area. This is very different if compared with pedestrianisation schemes in most other nations, especially those based on an American-style form of urban development.

One cannot understand the development of pedestrianisation in Germany merely as an isolated result of traditional urban transport planning which aims to both improve traffic circulation and to reduce traffic accidents. It is, rather, much more a result of the increasing importance and attention received by a wider range of goals for urban development, namely:

1. to defend the retail core areas against new developments in the urban fringe and against competing cities;
2. to preserve the historical townscape often located within parts of the city centre;
3. to provide better environmental protection;

4. to develop the city centre (especially the old city) also as an area of recreation and entertainment;
5. to upgrade the urban design quality and attractiveness of city centres in accordance with new models.

The last of the above concerns was nominated most often, in a survey made among German town planners, as the highest priority (see Monheim, 1975). On the one hand, this shows the importance of the psychological dimension of urban development. On the other hand, it is of special importance in Germany because in the competition between the many well-developed cities in the country, a good image and habitability attribute has become one of the most crucial factors in attracting highly qualified enterprises and employees.

Munich is the outstanding example of this new ethos. In the last three decades, it has become the place where most Germans would like to live and work. Munich has strengthened this image not least by introducing a spectacular pedestrian precinct on the occasion of the Olympic Games in 1972. This precinct immediately set a new standard for pedestrian areas and became the most famous in Germany, indeed one of the most well known in the world. Meanwhile, several other cities have developed their own precincts of a similar quality, although they are less well-known.

One may conclude from the above that pedestrianisation in Germany is not merely a technical planning response to a problem but a concrete expression of a special urban lifestyle desired by city dwellers as part of an on-going competitiveness between German cities. From the basis of this very special cultural background it follows that German pedestrianisation schemes cannot simply be copied elsewhere. Nevertheless, the fact that Germans consider pedestrianisation to be an important contribution to the good quality of life offered by their cities might make it worthwhile for planners and policy makers from other nations and cultures to learn more about how pedestrianisation occurred in Germany, and to consider the relative merits of its introduction to their own countries in the future.

The features of pedestrianization as a learning process is perhaps best illustrated by citing the developments of some examples as done below. The first of these examples is the scheme introduced in Munich. Other schemes discussed include those of Nuremberg, Hanover and Aachen. Due to restricted time and space, the review of each will by necessity be short.

Munich

The Munich pedestrian precinct has become especially famous because of the excellent connections it offers between historical and cultural identity, and economic strength. When one walks through the precinct one feels as if one is in a theatre. Looking at the historical facades and the rich mix of people, one is not aware that this area has in fact the highest concentration of retail outlets in the entire city, especially large department and chain stores (see Figure 1).

Interviews conducted in several cities in Germany have shown that this kind of environment is exactly what people prefer today. In essence, the public have indicated that they do not want to feel as if they are in a big department store when in a pedestrian area, even though shopping is the main purpose of their visit. It is argued in some quarters that shopping in the city centre has to a large extent today become synonymous with buying items people do not really need, and that to encourage this, it has become essential for retailers to provide an attractive environment both within and outside the store. It is very interesting that the biggest new retail development in Melbourne (Australia) - 'Melbourne Central' - was designed by the developer Daimaru from Japan with exactly this philosophy in mind.

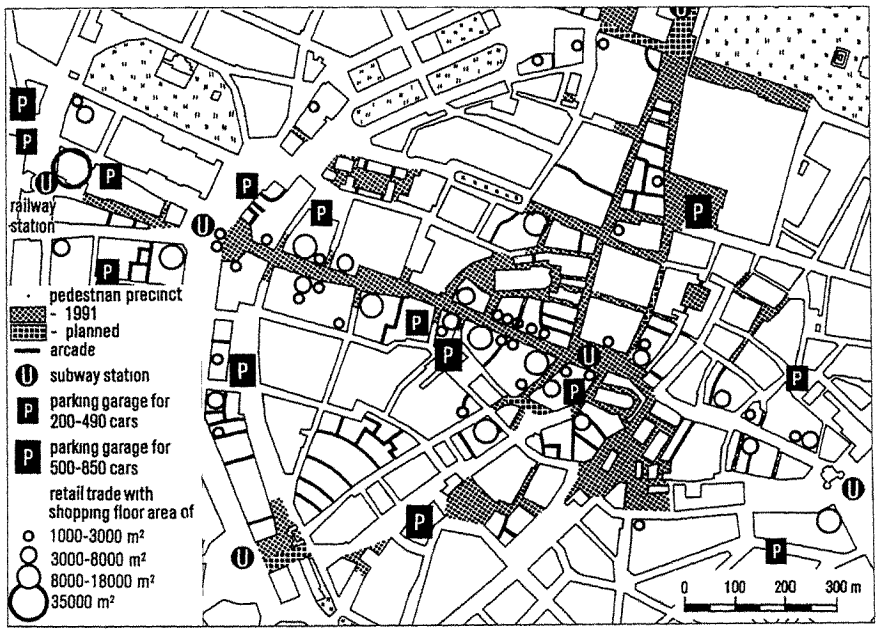

Figure 1: Munich· pedestrian precinct, traffic and large retail outlets

Pedestrianisation in Munich started with the mall - i.e., the street where most large shops and pedestrians were concentrated, plus some quieter streets and places of historical interest. From 1972, the precinct was enlarged annualy. The historical core of the city was blocked for through traffic by 1992. The result was not what was predicted. Traffic chaos did not occur and the city centre became pleasant again.

Initially, shopkeepers were in opposition to the scheme, as in similar situations world-wide. They argued that they would lose the higher income customers who typically use the motor car for shopping. In an up-market shopping street, retails feared that the increasing attractiveness of the precinct would encourage McDonald-type retailers to come to the area and, in effect, initiate a trading-down process of the area.

The success of the Munich precinct has caused problems. On weekends the area is often packed with people beyond its capacity, especially during events like an important soccer game or the 'Octoberfest' (see Figure 2). The shop rents have rocketed up which makes it difficult for many of the smaller shops to stay, especially the older established shops.

One important condition for this success has been the outstanding accessibility of the city centre by public transport, especially by subway and suburban rail, whose lines merge in that area (see Figure 3). Munich has in fact the highest share of public transport users of all German cities.


Schon über 70 Millionen verdient?
Glattes 5:0 über Ekuador/S. 18
898,-
PINI
Wahnsinns-Wochenende
München war dicht
Massen-Ansturm wie noch nie auf die Innenstadt
Berichte Seiten 3/4
Kommentar Seite 2

Figure 2: Munich: Newspaper Article about crowds in the city centre

As already suggested, the main current problem of public transport in Munich is its success and the lack of political will to spend the money necessary to fulfil the high demand for it by creating the additional services needed.

Recently, BMW, one of the leading motor car manufacturers in Germany, based in Munich, presented an ambitious traffic concept for the future of Munich's core area as part of a broader traffic management proposal (see Chapter 5). In the view of BMW, the so-called 'Blue Zone' which covers the city centre and some of

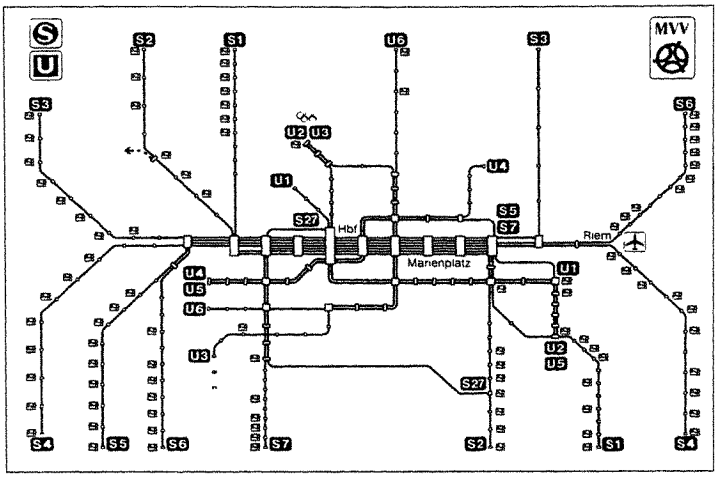

Figure3: Mass transit in Munich: Subway (U), Suburban rail (S) and P+R stations

the surrounding areas, is to be given area-wide priority for walking, cycling and public transport modes, and motor car access restricted to authorised drivers only. Parking facilities are to be diminished and concentrated on the periphery of the 'Blue Zone'. An efficient network of special city buses is to connect the parking and public transport stations with the major preferred destinations. The inner ringroad around the old town, originally considered to be an essential pre-condition for excluding motor cars from the old mainstreet, is proposed to become a green belt with only very limited motor car traffic.

Interestingly, BMW's proposal met with much public support. However, conservative politicians in the city, currently in opposition on the City Council, voted against most of the recommended proposals.

Nuremberg

In Nuremberg, pedestrianisation started in 1967 with a narrow secondary shopping street (Breite Gasse) designed in the typical way of the time (see Figure 4). After the initial great success of the pedestrian area, it was expanded by a new elected progressive city council in 1972. This was done, notwithstanding the fact that many warnings were received from transport planners who predicted that this would cause traffic chaos on the remaining roads. The chaos did not in fact occur as only one quarter of former number of motor cars subsequently used these roads. The same experience was repeated on three more occasions when other heavily congested roads were also closed to motor cars in the city, and traffic volumes on other streets grew by only 20-29% of the traffic originally on the then closed roads.

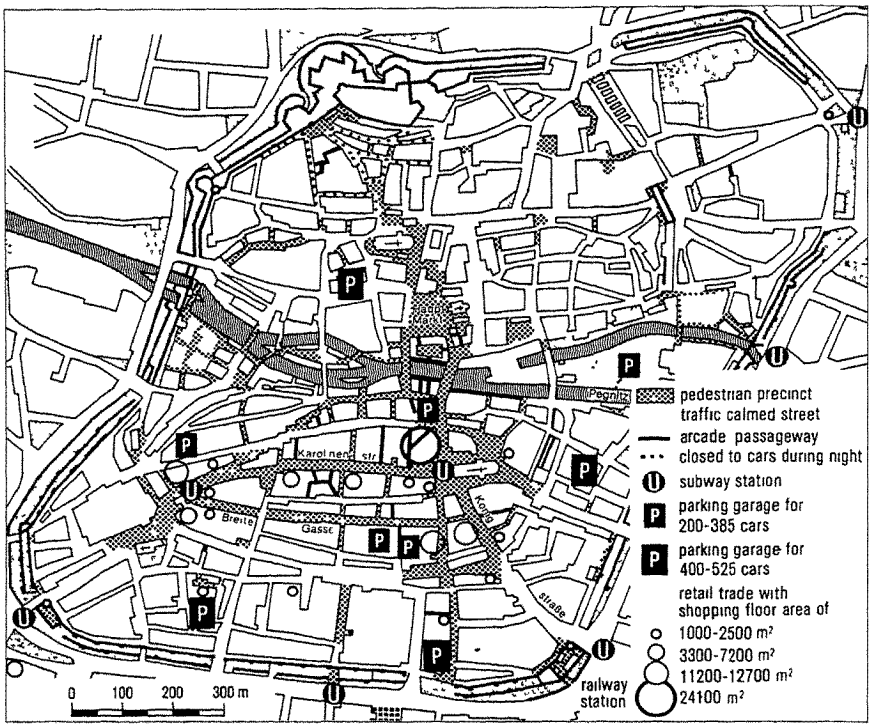

Figure 4: Nuremberg: pedestrian precinct, traffic and large retail facilities

Much of this unexpected outcome has been attributed to the decrease of traffic previously driving around the city centre in search of a parking facility, and not to the decrease of visitors which had been predicted by retailers (see Table 1). In fact collected statistics suggest the contrary was true. In the most important shopping streets, the numbers of pedestrians grew by two to three times previous levels since the introduction of pedestrianisation (see Figure 5). At Christmas, the number almost exceeded the physical capacity of the pedestrian area. In contrast, shopping streets remaining outside the pedestrian precinct lost patronage and declined in importance.

Despite the above, when pedestrianization in Nuremberg was expanded in 1988, which required the cutting-off of the last important through-road in order to integrate into the pedestrian area the most significant historical area, shopkeepers and conservative politicians were again up in arms. The retailers especially protested, and placed posters in their shop windows complaining that they would no longer be accessible to their customers. However, again the outcome was contrary to these fears, principally because the majority of the visitors to the city centre were in

favour of restricting motor car traffic in the areas the pedestrianisation was introduced. This was found to be the case even among those who relied on the motor car for shopping.

Table 1: Traffic-dislocations in downtown Nuremberg after closure of roads for pedestrianization

Streets closed for cars	Year of elevation		Motor cars before	Additional motor cars in parallelroads after street closure	
	before	after	(16 / 24h)	[cars]	[in % of former cars]
Museumsbrücke / Fleischbrücke	1972	1973	22,500 (24h)	+ 5,400	24%
Karolinenstrasse / Kaiserstrasse	1972	1973	20,900 (24h)	+ 5,400	26%
Bankgasse / Adlerstrasse	1982	1983	8,400 (24h)	+ 1,700	20%
Rathausplatz	1988	1989	24,600 (16h)	+ 7,100	29%

Source: Traffic count by the city of Nuremberg

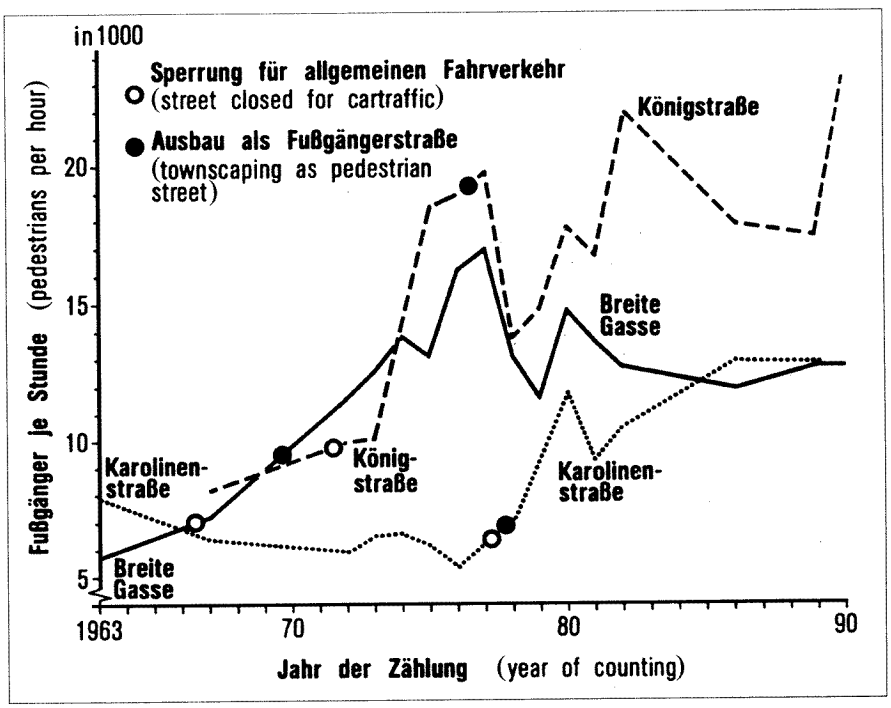

Figure 5: Nuremberg: Pedestrians in downtown main shopping malls 1963 - 1990

The great success in Nuremberg, as well as in Munich, was not simply due to the closing of streets to the motor vehicle but the multiple process of changes associated with the scheme. These included:

1. the improved access provided to the city centre as a result of new public transport services;
2. the establishment of more periphery parking garages;
3. the presence of new and newly modernized department and chain stores and arcades;
4. the improved urban design quality of the area emphasising and better-maintaining the remaining historical surroundings, even though more than 80% of Nuremburg city centre had been destroyed in World War II (see Figure 4 and 6);
5. the increased provision of the cultural and recreational attractiveness of the old town.

Nothwithstanding the large expansion of its pedestrian network (by more than 6 km) the citizens of Nuremberg remained disturbed by what they considered was still too much motor car traffic in their city in 1992. It was, therefore, decided to prohibit all through-road connections in the old town centre, and even between the various segments within the centre centre, and instead to allow motor vehicle access only via road loops where their exit was in the same sector as their entrance.

Figure 6: Nuremberg: Pedestrianized area

Hanover

In Hanover, pedestrianization started in 1956 with a narrow shopping street where department and chain stores were concentrated and motor car traffic could no longer be physically accommodated because of the high numbers of pedestrians it attracted. This was typical of situations in German cities in the early phases of pedestrianization, as in the case of the first two pedestrian streets in Germany, Hohe Strasse in Cologne and Limbecker Strasse in Essen, which were closed to motor cars in the 1920s.

The pedestrianisation of other narrow streets in the historical old town followed soon after (see Figure 7). The broad shopping streets were pedestrianised after the construction of two subway tunnels - a situation again typical of several large cities in Germany. In Station Street (Bahnhofstrasse) a second pedestrian mall was built one level below ground but open to the sky, which allowed pedestrians to cross the railway station without changing levels. This two-level mall became known as the 'Passerelle'.

Pedestrianisation in Hanover was initially part of a motor car-oriented traffic planning approach to the city. This meant that simultaneously to its introduction, ringroads were built with high traffic capacities. Town

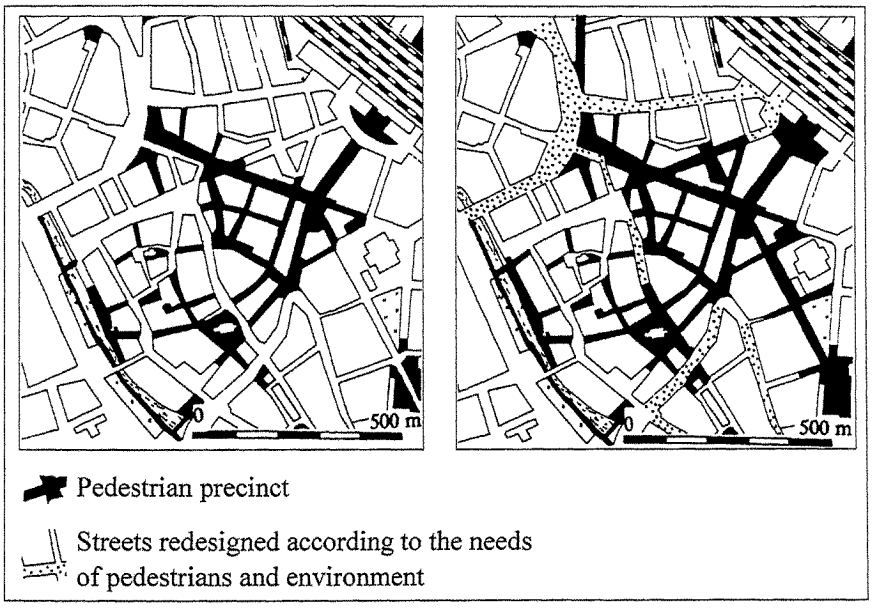

Figure 7: Hanover: Pedestrian precinct (left), planned traffic systen, meduim stage (right)

planning goals and policies have, however, changed very much since. From 1990, Hanover instigated a broad public discussion about traffic developments in the inner city. This included all interest groups and was documented in three volumes, later published by the city authorities.
The concepts for future development discussed aim at an essential reduction in motor car traffic. Access to the city centre was to be permitted only for users of public parking garages, and owners of private parking garages and residents. The ringroad and several streets within the city core, which had been generously widened for motor car traffic after the war, was to be re-designed in order to provide better operational conditions for higher capacity transport modes. In this way, it was intended to make them more compatible with the preferred urban character of the city. In addition to this, a large number of multistorey parking garages are to be closed in the city centre.

Aachen

In Aachen, pedestrianisation started in 1951 with a short and narrow secondary shopping street in the city centre. In the main shopping street motor car traffic was excluded at peak hours of pedestrian flow in 1963. Since then, the pedestrian precinct has expanded step by step. It includes many historically interesting alleys and places which have been renovated and revitalised the historical character of the centre which was heavily destroyed during World War II. This renewal and redevelopment effort greatly strengthened the attraction of the city centre, not only for fashionable shopping but also as a place for recreation and entertainment.

In 1973 a citizens' initiative, and in 1974 a thesis at a local engineering school, both developed concepts for area-wide traffic calming in the city within the historical town walls. The citizens proposed three phases of development; the last of which would consist of a vast network of pedestrian streets (with public transport), and access for motor cars in the remaining parts of the old town for residents and service vehicles only (see Figure 8). The thesis proposals, on the other hand, allowed access to the multistorey parking garages but interrupted through-traffic and divided the centre into traffic sectors with access on loops and no connection between sectors. Long-term parking was proposed on the periphery of the city at P&R facilities. The proposed expansion of the pedestrian precinct, however, was relatively modest.

The above proposals initially provoked little reaction. Almost two decades later, however, after a change in the political leadership of the city council, a so-called 'pedestrian friendly area' was introduced as an

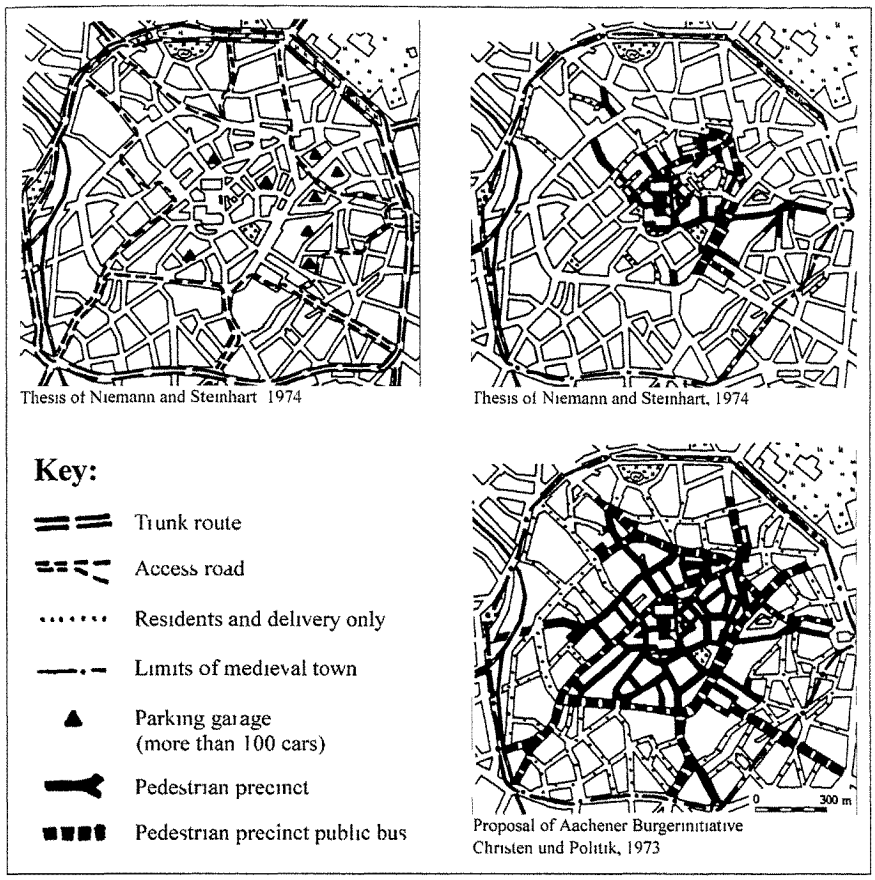

Figure 8: Pedestrian friendly concepts for the centre of Aachen

experiment, confined to Saturdays. Through-traffic was diverted and access to the streets within the central area closed, except for parking garage users and residents from 10 am until the evening. The frequency of public transport was then increased dramatically, and on the periphery large parking areas were provided, these being serviced by frequent bus services to the city centre. Bus use was made attractive by a cheap 'happy day ticket' for groups (see Figure 9).

A study of the effect of these changes show great reductions in environmental pollution and noise, an increase in the number of visitors and a considerable support among city centre visitors. Those coming on Saturday - which in Germany is the main shopping day - tend to stay several hours, to walk several miles, which they consider to be a pleasurable activity, and visit a great number of shops, coffee bars and restaurants (see Brockelt and Monheim, 1993).

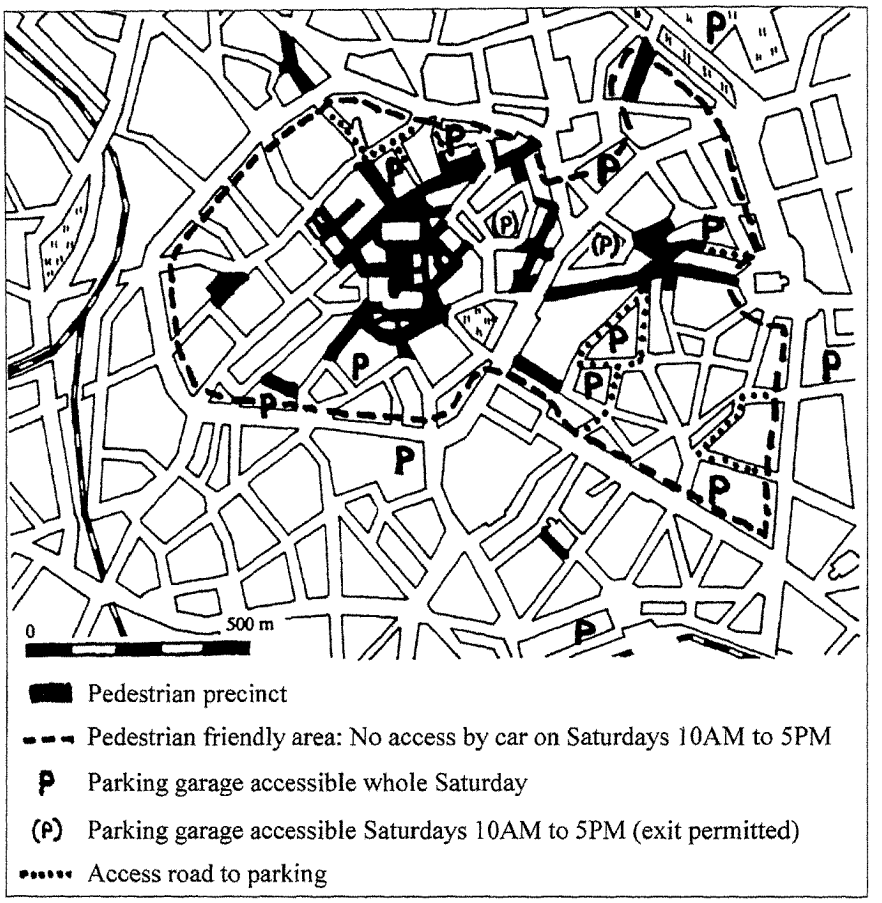

Figure 9: Downtown area of Aachen

On the other hand, some retailers, especially department stores, complained about decreasing sales on the Saturdays. It should be mentioned, however, that the retailers in Aachen, as in the case of Nuremberg, at first concentrated their public statements on problems which motor car users might encounter in reaching the shops, rather than advertise the improved overall accessibility afforded by other modes as a result of the new scheme (see Figure 10). At the same time, they attempted to develop/promote a better image.

Shopkeepers are, furthermore, typically very conservative, whereas the most far-reaching ideas and efforts at pedestrianisation in all German cities mentioned above have been developed by city councils with a so-called 'red-green' majority i.e., a mix of Social-Democrats and environmental groups. Opponents to the pedestrianisation efforts complain that

Figure 10:
Nuremberg: Poster against pedestrianization.

Title: No way (for our cars) if we do not have the will to fight (the roadblocks)

Bottom left: More roads to be closed?

Stamp (middle): Nuremberg: future backwater town?

the changes are more ideological than technical, and that ideology should not determine planning schemes. Whereas, supporters of pedestrianisation and accompanying traffic calming measures regard the growing support for such schemes more a product of changes in values and lifestyle, reflecting the current spirit of the time rather than a matter of ideology - just as motor car-oriented values influenced the outcome of town and traffic planning in the past both in Germany and elsewhere in the world.

Conclusions

The four German cities cited above are among the most successful in introducing pedestrianisation in the country, they are however not unique. Some twenty years ago, many town and transport planners thought that pedestrianisation as a process had reached maturity. In retrospect, this would have been true if the German experience had restricted itself to the American shopping mall pedestrian concept, which by and large, duplicates the US suburban shopping mall development model. Indeed, in the US most pedestrian precincts were not enlarged for

decades, some even have been reduced in size or have been abolished altogether. The development of pedestrianisation in German cities, however, as the preceding discussion suggests, took a very different direction, although not in all cases. A broader concept of pedestrianisation and traffic calming was instead adopted, not only in physical size but in the goals pursued. It employed pedestrianisation as a means of providing a focal point and catalyst for new urbanization.

It is interesting to note from international conferences that even in the US and Australia, an increasing number of planners, policy makers and public interest groups are now looking for similar quality attributes to city centres as those pursued in Germany, and that pedestrianisation schemes are seen to play an important part in achieving these. At the time of writing this chapter, Singapore was preparing a large pedestrianisation project. Perhaps after its expansion of US-style skyscrapers and freeways, it will turn more to European-style pedestrianisation and traffic calming concepts (1). Indeed, perhaps this trend can be encouraged throughout the major city centres of the world. They are certainly much more environmentally friendly solutions and less destructive responses to traffic congested city centres than the more motor vehicle dominated approaches of the past.

Notes

(1) In 1993, experts from Singapore's Urban Redevelopment Authority visited Munich, Nuremburg and Zurich and outlined their approach to the author.

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Part Two:

The Hong Kong Experience

Chapter 7

The Urban Transport Policy Agenda Revisited

Harry T. Dimitriou

Introduction

This chapter is in two parts. The first outlines the Government of Hong Kong's current transport policy agenda. This is based on a briefing to LEGCO Members in October 1991 (Secretary for Transport, Government of Hong Kong, 1991), as well as the contents of the White Paper on Transport Policy published in January 1990 (Transport Branch, Secretariat, Government of Hong Kong, 1990). The second part of the chapter focuses on particular important issues of urban transport policy and planning practice that have been raised elsewhere internationally and discussed by the author in another publication (see Dimitriou, 1992) with a view to examining their relevance to the Hong Kong experience.

The Stated Current Transport Policy Agenda

Background

The most recent deliberation of Hong Kong's transport policy is the government's White Paper on Transport Policy entitled 'Moving into the Twenty-First Century' (Transport Branch, 1990). This was based on the findings of the Second Comprehensive Transport Study (Transport Department & Wilbur Smith Asociates, 1989). The main objective of the Hong Kong Government's transport policy may be summarised thus:

> *"... to provide a transport system which can maintain a reasonable level of mobility for people and goods necessary to support economic growth and to meet the social, commercial and recreational needs of the community" (Secretary for Transport, 1991).*

The Government has sought to achieve this by:

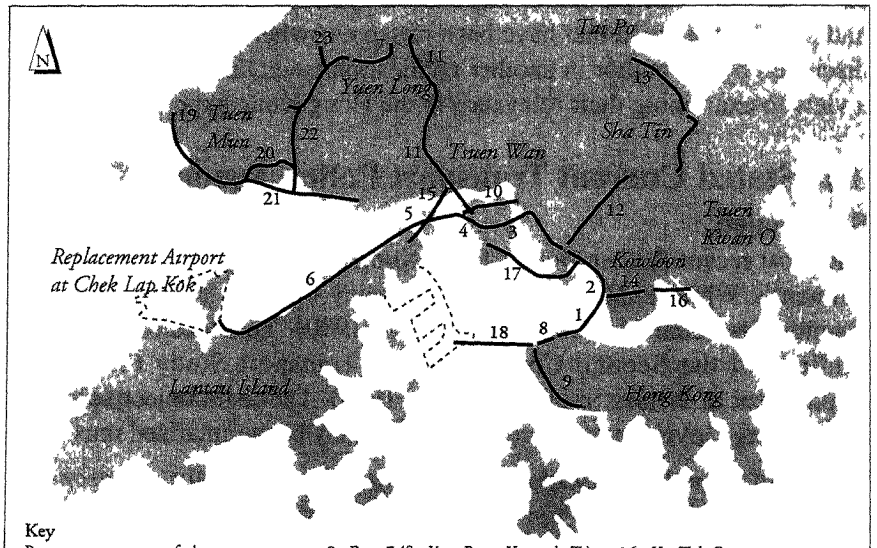
1. improving transport infrastructure - that is building new roads and railways and improving existing facilities;
2. expanding and upgrading public transport services;

3. managing road usage - for example, by controlling the growth in numbers of vehicles and giving priority to public transport.

Generally speaking, the Government has to date succeeded in achieving its prime objective of maintaining reasonable levels of mobility, despite substantial increases in motor vehicle numbers; particularly so if one compares Hong Kong's levels of mobility with other cities in the region.

Whereas other cities have continuously experienced decreasing average vehicle speeds, such speeds in Hong Kong's urban areas have improved from 23.3 km per hour in 1988 to 23.7 km per hour in 1990. However, future prospects for transport operations and urban development in Hong Kong are more daunting and problematic, as high levels of economic development and traffic growth are sustained, and the prospects of urban decentralisation in the New Territories increases.

To quickly provide a general picture of the public works programme for Hong Kong in the transport sector, a brief account is given below of committed and prospective projects which are reflective of the general direction of transport policy presently adopted by the government.



Key

Projects in sequence of phasing		
1 Route 3 (West Harbour Crossing)	8 Rote 7 (Sai Ying Pun - Kennedy T)	16 Kai Tak Connector
2 Route 3 (West Kln Expressway)	9 Rote 7 (Kennedy T - Aberdeen)	17 Route 9 (Oras)
3 Route 3 (Bridge to Tsing Yi)	10 Tsing Yi - Tsing Chau	18 Green Island Link
4 Route 3 (Oras)	11 Route 3 (Country Park)	19 Tuen Mun Port Trunk Route
5 Lantau Fixed Crossing	12 Route 6 (West Kln - Shatin)	20 Southern Relief Road
6 North Lantau Expressway	13 Tai Po - Shaun	21 Southern Bypass
7 Yuen Long Southern Bypass	14 Central Kowloon Route	22 Eastern Bypass
	15 Ma Wan - Sham Tseng Link	23 Tin Shui Wai West Access

Figute 1· New Strategic Highway Schemes to 2011

Road Construction

More than HK$ 3 billion has been spent on the construction of new roads in 1991/2. The figure is programmed to increase to HK$ 4.5 billion when roads required in connection with the new airport are completed. Major sections of the New Territories Circular Road have been completed as has the new Yuen Long/Tuen Mun Eastern Corridor. These projects alone cost nearly $1.9 billion. Other major projects that commenced in 1991 are now complete or near completion, costing $407 million (see Figure 1).

Another major road project (the section of the proposed Route 3, stretching from the northwest New Territories to Tsing Yi) is scheduled for completion in the late 1990's. While preparations are now in hand for the construction of the Western Harbour Crossing by the private sector as a build, operate and transfer (BOT) project (again refer to Figure 1). The tunnel will be completed by early 1997.

Cross-border road traffic has continued to increase dramatically. There were almost 5 million vehicle crossings in 1990, compared with 4.4 million in 1989. The latest figures of approximately 6.5 crossings confirm a further significant increase. This is reflective of the strong economic ties Hong Kong has with the fast growing and vibrant economy of Southern China.

Strategic Studies

Work has been completed on three major strategic studies which will have a major influence in determining future transport policy in Hong Kong, namely:

1. the Railway Development Study (Transport Branch, Highways Department and MVA, 1993) - which attempts to map out an optimal railway network for Hong Kong for the next 20 years;
2. the Freight Transport Study (Transport Department & Scott Wilson Kirkpatrick, 1994), which looks into ways of improving the efficiency of the freight transport industry and recommends a policy package for future development of the industry;
3. the updating of the Second Comprehensive Transport Study (CTS II) (Transport Department & Wilbur Smith Associates, 1992) - this computer based model update has been employed to project the future growth of traffic in the Territory, and anticipates the need for additional new roads and some changes in current transport policy.

Public Transport Improvements

Hong Kong's limited road space and difficult terrain has led priority to be given to mass public transport carriers, especially off-street rail services. Public transport ridership of railways has been growing from a daily average of 6.2 million in 1978 to 9.7 million in 1991. This is forecast to reach 11.7 million by 1996. Rail services have, furthermore, expanded their market share of public transport services from 0.7% in 1978 to 28.1% in 1991. Current (1993) statistics suggest a further increase, with a forecast of this growing to 30.2% by 1996.

Part of this expansion of rail patronage is being planned for by the Mass Transit Railway Corporation (MTRC) of Hong Kong which in 1992 accommodated 751 million journeys. It is a present also actively pursuing the development of the Airport Railway, linking Hong Kong island with the new Airport at Chek Lap Kok (see Figure 1). Work has progressed on this project despite the uncertainties associated with the completion of the new airport arising from the current problematic political relations with China.

The Kowloon-Canton Railway Corporation (KCRC) completed a $1 billion renovation and maintenance programme of its facilities (at Ho Tung Lau) in 1992. In addition, approximately $700 million was budgeted to improve its railway infrastructure and capacity (including provision of new or additional rolling stock) with a view to providing an increased passenger carrying capacity by 50% in 1992 compared with that of 1989. Concerning Light Rail Transit (LRT) services, three more links have been commissioned in Tuen Mun (in February 1992), adding an extra 5 kms of track at a cost of over $200 million (see Figure 1 and Chapter 10).

As regards the quality of services - with rising consumer expectations in Hong Kong there has been a continued emphasis on quality improvement in public transport services, particularly rail travel. For example, as a result of improving traffic conditions and the wider use of air-conditioned buses (an estimated cost of $650 million was recently spent on this aspect) KMB's patronage in the first eight months of 1991 increased by 7 million passenger trips, compared to the same period the previous year. This reversed a previous downward trend in patronage which had persisted since 1987.

The Hong Kong Government has the intention, as a matter of policy, to continue to develop a public transport network which offers a range of choices to passengers at reasonable fares, matched to differing levels of comfort, speed and convenience. To a degree this has been demonstrated

by the fact that the first franchised bus route allocated by open tender (from Central to MacDonnell Road) was awarded in August, 1991. Opportunities for introducing more such services are under consideration.

Finally, to make public transport operators directly accountable to their customers, operators have been for some time now encouraged to establish liaison groups to provide better interactive communication with their passengers.

Traffic Management and Improvements in Technology

Improvements to traffic management in Hong Kong continue to be introduced wherever possible. Relatively recent improvements include the Kowloon Area Traffic Control (ATC) System, which is reported to control 325 signalised junctions, or 86% of the total signalised junctions in Kowloon. The Hong Kong Island System, on the other hand, although only a few years ago covered 200 signalised junctions, has now been extended to the Mid Levels and Happy Valley.

To encourage the use of mass public transport carriers, the MTRC's Common Stored Value Ticket was extended to the KCR in 1984, and to 12 KB bus routes and Citybus routes in 1989. An extension of these facilities to 7 more KMB bus routes is now complete, while the use of the ticket for other transport modes is being considered.

A trial scheme to introduce new parking technology, in the form of electronic card-operated meters and pay and display ticket machines, started in 1992.

Road Maintenance and Safety

Road openings for repairs to public utility services and maintenance reasons are a constant cause of congestion and public nuisance in Hong Kong. Measures have been actively considered to reduce the inconvenience caused by these, including the possible introduction of a lane rental policy, whereby utility companies will have to pay for occupying valuable road space to carry out works.

The Hong Kong Government continues to promote road safety, with a view to reducing traffic accidents and traffic disruption, by:

1. proposing legislative amendments to provide for stricter controls on the over-loading of goods vehicles;
2. proposing legislative controls on the registration and use of vehicles used exclusively for advertising purposes.

Improvements in traffic accident statistics have been reported, with the number of casualties in Hong Kong declining by 4.1% in the first six months of 1991, compared with the same period in 1990. More recent statistics indicate that at 15,322 accidents for 1992 (of which 11,500 were slight), traffic accidents have remained more or less at the same level. These trends, however, are very different to regional trends in Southeast Asia and uphold Hong Kong as one of the safest cities to drive in the Asia region.

Growth in Motor Vehicle Fleet

The number of licensed private motor cars on Hong Kong's roads increased by about 12% (25,200) in the ten-year period from 1981 to 1991. High annual percentage increases have been recorded since 1988 (9.9% in 1989, 10.2% in 1990, 9.8% in 1991) (see Figure 2). The rate of increase, however, slowed down in 1991. There were 236,847 licensed private motor cars in 1991. Statistics for 1992 indicate that there were approximately 265,800 private motor cars (Transport Department, 1992). The most recent estimates indicate that this has risen to 274,933 (Transport Department, 1993) (see also Chapter 9).

Trends indicate that compared with private motor cars, the increase in the numbers of goods vehicles has been constantly greater, reflecting the growth in the local and regional economies. Between 1981 and 1992, the goods motor vehicle fleet increased from 53,000 in 1981 to approximately 117,700 by January, 1992. This represents an average growth rate of a little less the 12% per annum. Part of this rapid increase in the goods vehicle fleet was due to the use of light goods vehicles (LGV) for personal transport, thereby exploiting tax differentials in the first registration tax and the annual licence fees.

To plug the tax loophole, and to reduce the congestion caused by the proliferation of LGVs, the first registration tax and annual licence fees for these vehicles were raised in March 1991. As a result, the number of licensed smaller LGVs dropped contributing to a relatively modest overall increase of 2.4% for goods vehicles of 1991. While this decline in the smaller LGVs has continued for the period 1992-1993), there has been a 4% increase of the larger LGVs, and an overall 28% increase of heavy goods vehicles in the last year for the same period.

Management of Road Tunnels

The management of the Aberdeen Tunnel was privatised with effect from 1991 with the same level of service to the public maintained. The remaining four government operated tunnels are to be handed over to pri-

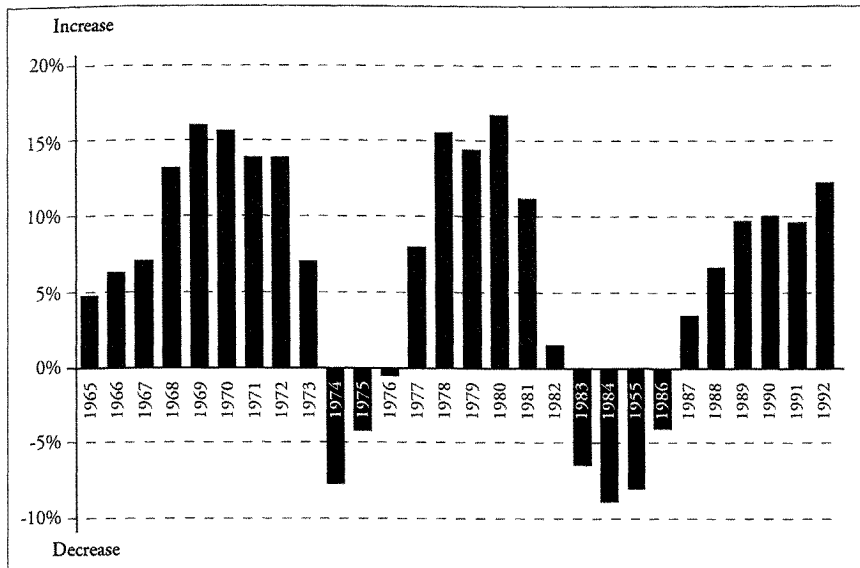


Figure 2: Changes in registered private motor cars (year's end to year's end)

vate management in the furtherance of the Government's aim to contain the size of the civil service and to promote efficiency. Other possible areas for privatization in the transport area which are being pursued include the contracting out of parking meter management, the Transport Department's licensing function, certain aspects of driver testing, and the privatisation of the KCRC.

Transport professionals and environmentalists in Hong Kong are continuously looking at ways to reduce fuel and motor vehicle emissions. In so doing, they have generally concentrated their policy discussions on economic factors, such as income and fuel price management or on technological factors (vehicular efficiency). Undoubtedly, these factors are important, but the relationship between urban densities, the traffic they generate and motor car use, is at least as important (see Dimitriou and Fouchier, 1993). This suggests, that urban and regional planning can indeed play an important role in the reduction of energy consumption and pollution. This is especially important for Hong Kong's because it has limited road space and a difficult terrain which means that priority must be given (as it is) to the mass public transport carriers, especially off-street rail services.

International Lessons of Urban Transport Planning

In 1992, the author published a book which highlighted a number of lessons of international practices of urban transport planning, some of which have a bearing on the Hong Kong experience (see Dimitriou, 1992). These lessons were divided into those gleaned from industrialised nations and those from Third World countries. Since Hong Kong's per capita income levels at present suggest it has more in common with the former than the latter but is paradoxically about to join the largest Third World Country - China - reference is here made to selected aspects of both sets of lessons. Those lessons believed to be pertinent to Hong Kong's situation extracted from the author's book include:

Lessons from the Industrialised Nations

Lesson 1: Urban transport planning still awaits a true multi-disciplinary approach. The past treatment of the field as essentially an engineering science is inappropriate in any context, more so in developing ecnomies. While the use of specific 'scientific' tools are extremely helpful in tackling certain problems, it is ultimately not the technical rationale that determines the outcome of investment decisions but a mixture of many rationales of which the political often overrides.

Lesson 3: More explicit planning efforts need to be introduced to cater for urban travel other than motorised movement. Despite claims to the contrary and the increased emphasis on public transport, the Urban Transport Planning (UTP) Process and its derivatives are more supportive of private motorised transport than other modes.

Lesson 4: A movement away from the pre-occupation with the urban travel demand component of the planning exercise is needed. The 'Four Stage Model' of travel demand has remained the corner-stone of urban transport planning practice for too long, to a point that not only has it misrepresented the scope of transport planning in urban areas but constrained more innovative thinking in the field.

Lesson 5: Due regard needs to be paid to the contextual realities and political socio-economic environments of urban transport policy making, planning and model building. These have for too long, with dire consequences, been underrated in the interests of the mechanics of model building and other techniques employed.

Lesson 6: More normative directives with political backing are required in urban transport planning. Trend planning has charac-

terised most planning practices in this field, with the result that not only has the normative content of such exercises been under-emphasised, but trends have far too often formed the basis of policies.

Lesson 7: The claim that conventional approaches to urban transport planning are 'comprehensive' needs to be accepted for the myth it is. The demand for broader and more 'open planning' approaches to urban transport, involving greater environmental considerations and public participation, have revealed, beyond doubt that considerations of transport systems operation have undeservedly overshadowed those of transport systems impacts.

Lesson 8: The emergence of 'projectitus' as a basis for the development of urban transport is counter-productive. The UTP package as a basis for past conventional urban transport planning practices, typified by its public sector dominance, was stretched to its limits in terms of both political and technical viability. It has thus increasingly given way to practices driven by the market approach. These are epitomised by short term considerations, an emphasis on cost revenue schemes, a greater involvement of the private sector and the development of projects outside of a coherent planning framework.

Lesson 9: The perpetuation of past errors needs to be avoided. Although the UTP Process has by and large disintegrated as a single entity, there has been a proliferation of UTP derivatives that offer 'partial' and 'disaggregated analyses' which employ principles and assumptions closely akin to those of the UTP Process. The continued use of these techniques not only perpetuates past errors of urban transport planning but also draws attention and investment away from less formalised and potentially more open and useful approaches.

Lesson 10: Greater planning attention needs to be given to the 'lowerarchy' of the urban transport system. The tendency is for urban transport planning studies to typically focus on 'line-haul' travel. This has led to both the construction of imbalanced urban transport systems and to inadequate attention being paid to the detailing of the lower levels of these systems, particularly at the neighbourhood/community level.

Lessons from Third World Nations

Lesson 3: More concerted efforts are needed to translate macro development planning objectives into meaningful local and sectoral terms. Development planners and economists have long had

considerable difficulties in translating their macro-economic ideas and policies into spatial and urban development terms. Understanding the dynamics and issues of urban development however, is as much a pre-requisite for urban transport planning and traffic engineering practice as is sound professional engineering competence.

Lesson 4: Transport problems need to be perceived and thus tackled from different (but coordinated) standpoints. The lack of compatibility and agreement among the professions involved in urban transport have contributed considerably to the problems of the sub-sector. While, urban transport problems are readily presented in terms of their traditional agenda, they also need to be differentiated in terms of 'root' and 'manifestation' problems.

Lesson 6: Engineering measures independent of land use planning cannot resolve urban transport problems. Many highway and traffic engineering schemes associated with urban transport planning efforts seem to rely upon the misconception that problems of traffic congestion and parking can be successfully tackled by engineering measures, independent of meaningful land use control. Any planning approach that does not however, accommodate the complexities of the problems it is to address is destined not only to fail but possibly generate additional and more costly problems.

Lesson 7: The critical question is not the techniques of urban transport planning but of strategy. The principal issue is whether a Third World City should duplicate the same kind of development and transportation strategy typically pursued by industrialised countries such as the US. A major problem of the UTP Process and many of its travel demand forecasting derivatives is that in a constrained Third World situation, any kind of travel demand forecasting will show that all facilities will be super-saturated. This is a fact that needs to be feedback into both the development and transport strategies, and its impacts duly assessed.

Lesson 8: There are severe limitations to the sole use of the economic rationale in urban transport planning. It is claimed that conventional urban transport planning practice does not distinguish between 'travel needs' and 'travel desires' because transport facilities in Third World cities are often priced in an obscure way. The economic rationale of the UTP Process furthermore, finds it very difficult to plan for basic needs or 'entitlements' that are not evident in the marketplace. It is however, irrational to presume when people cannot afford to pay for transport needs that they do not need them.

Review of Hong Kong's Transport Policy Agenda

Three Issues

While the international lessons cited above inevitably raise a number of questions and issues concerning Hong Kong's Transport Policy agenda for which there is inadequate space to discuss here in depth, three interrelated issues believed to explain some of the fundamental problems underlying Hong Kong's Transport Policy and how transport priorities are arrived at, are discussed below. These include:

1. the question of defining the task/scope of urban transport policy-making;
2. the issue of the transport user bias in planning exercises and treatment of externalities;
3. the excessive focus on economic growth and insufficient treatment of environmental considerations.

Defining the Task and Scope of Urban Transport Policy-Making

Reviewing the outlined transport priorities of the Hong Kong Government and supporting documentation, it is clear an important distinction has not been made between:

1. the transport projects and programmes selected on the basis of their operations performance (i.e., 'transport operations efficiency');
2. the policy and planning guidelines needed for selecting among courses of action that take into account the effectiveness of alternatively considered transport infrastructure and services in the achievement of broader development goals that include considerations of the environment, equity and urban planning (i.e., 'transport effectiveness').

The term 'urban transport', furthermore, refers to transport systems in a particular environment (an urban environment), which may be said to be comprised of (after Thomas, 1970):

1. inputs to the transport system (i.e., travellers, freight, land, fuel etc.);
2. the transport system itself (i.e., fixed facilities and traffic flows);
3. outputs to the transport system (i.e., travellers, freight, employees, waste products etc.;
4. the environment in which the transport system operates - with its land, air, visual, noise and sense qualities.

On the basis of the above, effective urban transport policy-making presupposes an understanding of not only the dynamics and composition of urban movement problems that certain kinds of transport policies are intended to tackle, but also the economic, political, social and environ-

mental perspectives of the same area of concern. The urban transport policy agenda of Hong Kong clearly has all these perspectives sub-assumed within and secondary to economic growth aims.

Adopting a broader perspective to urban transport policy, more effective policy-making can be better achieved through 'dissolving' problems rather than 'solving' them. Put another way, transport problems can be more effectively tackled by the use of policies that address 'root problems' (that may arise from outside the transport sector) rather than executing projects that tackle 'manifestation problems' within the sector, thereby leaving the former un-addressed (see Figure 3). It is clear from the first part of this chapter that the Hong Kong Government transport policy emphasises projects and misses this very important point.

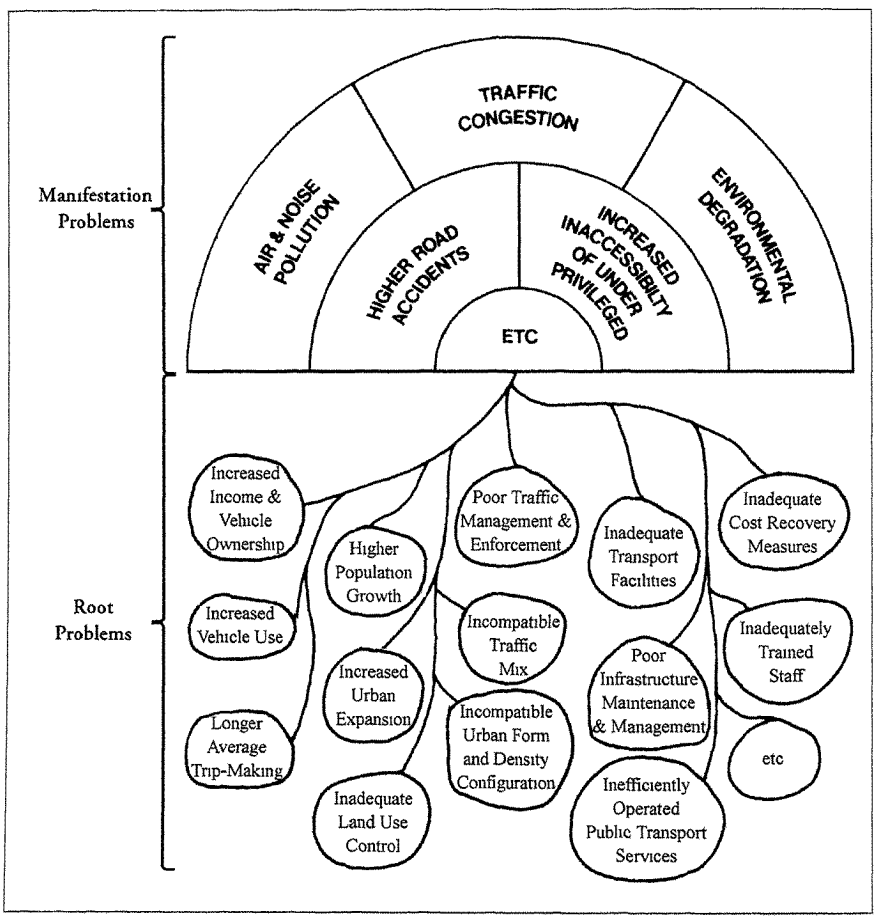


Figure 3: Urban Transport manifestation and root problems

The Transport User Bias and Externalities

The extent to which traditional urban transport planning of the kind epitomised by CTS II, provides a comprehensive treatment of the area it claims to cover has long been under debate. The author has argued elsewhere (see Dimitriou, 1990 and 1992) that the preoccupation of the UTP process with detailed modelling of traffic movement and transport user aspects has led to an in-depth concern for transport-user matters and an inadequate examination of wider contextual policy issues and non-transport user considerations.

In the industrialised countries, externality considerations of urban transport systems began to emerge in the early to mid 1970s. By the late 1980s they featured much more than ever before, but some would argue still not enough. As much of the preceding discussion implies, a great deal of attention is paid in the Hong Kong transport policy agenda to how the transport system works, and how it can be pragmatically improved rather than how it should work. This entails the use of techniques that attempt to quantify a great deal of the phenomena observed and the digesting of much information. It is very apparent, however, that many issues (especially regarding the quantification of externalities) remain unresolved primarily because they are more political than technical, and therefore require policy not technical guidance.

Part of the greater concern for externalities associated with transport projects is for differential impacts on different geographical areas and groups of people. It is well known that the issue of equity in transport is hard to evaluate because it can be argued, as it is in Hong Kong, that transport improvements are provided for everyone. However, it should not come as a surprise that the poor, young, elderly and handicapped are often confined to a very constricted radius of mobility by virtue of increased fares, physical inaccessibility to services and infrequent services in certain parts of the Territory, as in the case of some new towns. Special transport policies addressing the needs of such people are particularly absent in Hong Kong.

Changing Schools of Thought in Transport Policy-making

Changes of thought on urban development over the recent decades have reflected a shifting emphasis of ideas in development planning, sometimes like a tide slowly receding only to return again with greater force. Because urban transport is but a service/support network to urban development, it too is subjected to these same shifting ideas and forces, and cannot therefore escape them. In this regard, the emphasis and treatment

of Hong Kong's transport policy agenda seems to have been fossilised into the kind of priorities pursued in the industrialised nations in the 1970s, which sought to accomodate as much traffic growth as can be afforded in financial terms, ignoring changing priorities in urban development and environmental concerns.

Whereas in the industrialised world, development has in the past been seen to be synonymous with economic growth, there is now a greater awareness of the inadequacies of economic growth-led strategies, and a realisation that the concept cannot be sustained without some serious consideration of equity and environmental constraints. This stage of awareness seems not to have reached government mainstream thought in Hong Kong. Although, it should be stated that the extent to which the urban transport planning profession world-wide has seriously taken-on-board these considerations is also open to debate, if their present day recommendations for Asia are anything to go by.

The present momentum to change direction to more environmentally sustainable approaches to urban and transport planning is now very strong and cannot be denied. Much of the delay in arriving at a meeting of minds can be attributed to the development planners' and environmentalists' considerable difficulty in translating their concerns into what the transport planner and traffic engineer consider 'meaningful' and 'practical' terms. The net result of which is that these concerns have been ignored if they are not politicised to a point that they cannot be ignored by the politicians and policy makers. This situation has clearly yet to be reached in Hong Kong.

The contributions of urban transport to economic growth in opening up new economically productive opportunities and reducing the cost of travel is a concept well understood by transport planners and traffic engineers alike in Hong Kong. In fact, the enhancement of this contribution has to a large extent been the raison d'etre of the role of these professions in the past (Dimitriou, 1992). An equivalent role of the functions of transport in urban development, other than those associated with the generation of economic growth, has been less well marked in Hong Kong and urgently warrants further development/emphasis in future transport policy formulation.

Since transport is universally acknowledged to be the servant of development, one may conclude from the preceding discussion that an understanding of the dynamics and issues of Hong Kong's urban development is as much, if not more, a prerequisite for urban transport policy-

making and planning as is a sound engineering or administrative competence. There is, in other words, a need to re-orientate urban transport policy-making in the Territory toward the planning of transport specifically for urban development rather than planning transport systems per se. This in turn requires a change of direction to be taken by Hong Kong's policy-makers, possibly supported by dissemination and training exercises within government, to explain the importance of this new direction, and how the change may be best achieved.

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Chapter 8:

Managing Transport for Environmental Quality*

William F. Barron

Introduction

Large metropolitan cities are at least as much a feature of the developing and newly industrializing economies as they are of the longer established industrialised nations of the world. While the phenomenon of metropolitan urban development anywhere creates certain commonalities of problems and options (e.g., how routinely to move large numbers of people within confined spaces and the roles for various forms of mass transit in providing such services), it is still important to recognize that the metropolitan areas of East and Southeast Asia (like those in Latin America, South Asia and elsewhere) are experiencing forms of development and associated environmental problems which often are without precedent in the older core areas of the so called 'developed world'.

This is especially true for the largest metropolitan areas of 'emerging East and Southeast Asia' at the lower end of the income scale (e.g., Jakarta, Manila and Bangkok) and those with incomes now beginning to surpass parts of Western Europe (e.g., Hong Kong and Singapore). Certain types of environmental problems have not yet become as prominent in these cities as they are in the 'West' or Japan (e.g., those resulting from very high per capita energy consumption levels), because incomes of the general populace have not yet reached levels of the more affluent countries, though the growth trends are striking. Of more immediate concern in these very large cities of the developing and newly industrialising economies of the region is that even in the most notable of these economic success stories, growth has been so fast and so recent that infrastructure development (e.g., sewage treatment, effective motor vehicle emission controls) has typically lagged well behind (see Pernia, 1991, and Dimitriou, 1992).

While generalisations are often something of an oversimplification, it is reasonably accurate to characterise the basic environmental issue for many of the major cities of the older industrialised societies of North America and Europe as being one of: how to upgrade environmental quality under conditions of high but rather stagnant income levels and how to fund environmental investments during a time of concern over their future economic prospects in an increasingly integrated and competitive world economy. In contrast, in much of developing Asia the issue more often is one of: how to slow the pervasive environmental degradation in a time of rapid growth (and change) and strong expectations that personal disposable incomes (and associated consumerism) will continue to rise quickly.

Considering specifically the transport sector, the major cities of Asia are experiencing problems due to the explosive growth of motor vehicles. Yet, outside of Japan, the private motor car typically plays only a moderate part in this. The region's basic transport problems lie not so much with extensive use of low density transport (such as single passenger automobiles), but more in its heavily patronised but overcrowded and poorly maintained diesel buses, and widely used diesel goods vehicles with all the air pollutant emission impacts this conveys. As an economist at the Asian Development Bank noted:

> *"...air pollution levels have increased as the average age of both public and private conveyances tends to be overextended and proper maintenance becomes more difficult" (Pernia, 1991).*

The point here is that the experiences and plans from North America, Europe and Japan may have some value as models for the largest cities of the emerging economies of East and Southeast Asia, but it must be recognised that such models are of limited relevance and therefore need to be substantially reshaped, if they are to be usefully applied in the Asian context. This may be simply a statement of the obvious. Yet, it bears repeating.

This is especially pertinent to the preceding contributions from Germany in Part One of this publication which among other things extol the benefits of their first steps in reducing dependence on the private motor car for commuting and the implicit message to urge Hong Kong transport planners to consider applying similar measures. In fact, the existing transport system in Hong Kong goes far beyond the most futuristic dreams of the German situation in terms of extensive and heavily utilized rail and bus systems, and only a moderate reliance on the private motor car (1).

However, it is also important to stress that even with its impressive successes in terms of mass transit, Hong Kong still has severe transport and related environmental problems. And at least partial solutions, particu-larly for the near and mid-term, lie in models which can be more or less directly copied from the West and Japan.

The Hong Kong Context

Hong Kong is a British colony with more than 5.8 million people, approximately 98% of whom are ethnic Chinese. In 1997, the Territory will come under the control of the People's Republic of China (PRC) and become a new 'Special Administrative Region' of Hong Kong. Under the Basic Law agreed by both the British and Chinese Governments, Hong Kong is to retain its economic and political systems for at least 50 years.

The territory of Hong Kong is perhaps one of the world's most impressive recent economic success stories. Its per capita income is now higher than that of Ireland or Spain and it could well pass that of Britain before long. It has the world's busiest ports and is the eleventh largest trading economy. From 1983 to 1991 average annual real economic growth was 6.8% (Hong Kong Government, 1984 to 1992). The Hong Kong Government typically runs a large financial surplus despite a low personal and moderate corporate tax rate.

One striking feature is that this success has occurred in a small geographic area nearly all of which is sea or mountains. What flat land there is today - and there is still not a lot of it - is mostly filled-in sea bed or notched-out mountainside. Of Hong Kong's total land area, only about 15% is developed, with most of the rest being steeply sloped hills with thin, nutrient-poor soils prone to rock and mudslides. Population centers are squeezed into pockets of very high density development (typically cited as among the highest in the world) where residences, commercial establishments, utility lines, transport routes, and in several widely scattered parts of the territory, thousands of small factories, are uncomfortably juxtaposed.

The various public transport systems (see Chapters 8 and 9) respond rather well to these challenges of population density and terrain to provide about three quarters of all transport journeys undertaken. They have been able to do this by making effective use of the high densities to create reliable, moderately priced (but self-financing), electric surface and underground rail systems, numerous double-decker and minibus services,

widely available and convenient taxi services, and an extensive system of ferries. As the Hong Kong Government likes to boast:

> *".... the Hong Kong public transport system is notable for its variety of modes and operators and its intensity of service [which] ... extends to almost very part of the territory" (Hong Kong Government, 1992).*

Yet, even so, road congestion is often a problem and as other sources of air pollution are being attacked with some success, transport is becoming more and more the target.

Before considering the transport sector's link with the environment in more detail, there are two fiscal matters which should be noted as further context to the review of policy options given below. First, the Hong Kong Government is determined to complete the massive new airport and a substantial share of its associated development projects (e.g., transport links and seaport expansion) by the time of the 1997 hand-over of the territory to China (see Chapter 7). The price tag for these Port and Airport Development Strategy (PADS) projects is in the tens of billions of US dollars, and keeps rising as tenders for specific portions of frequently bid substantially over projected costs. Private financing levels have been disappointing as a result of the projects falling victim to the current political disagreements between Britain and China. The Hong Kong Administration is simultaneously concerned that other demands on its resources should not constrain its ability to step-in financially (whenever needed) to ensure that the airport project keeps to schedule.

The second fiscal matter to be noted is that the Hong Kong dollar is tied to the US dollar, yet Hong Kong's inflation rate in recent years has been several times that in the US, thus putting severe strain on the HK dollar/US dollar peg. Maintaining the existing peg (at about $US 1 = $HK 7.8) is considered to be very important in maintaining confidence in the Hong Kong economy in the run-up to 1997 and beyond.

The outcome of the above two factors is twofold. Firstly, the government looks very carefully at any possible inflationary impacts of public policy decisions. Secondly, infrastructure projects outside those closely related to PADS seem to be given a lower priority - the environment being given no special consideration in this regard.

Air Quality and the Transport sector

The air quality of Hong Kong certainly is not in the frightening stages cited by Pernia (1991) for Bangkok and Manila, or the legendary gritty

sulphuric haze of wintertime Beijing and Xian. Yet even so, as the Environmental Protection Department (EPD) of the Hong Kong Government (1991) put it:

"... clean air is no longer a common commodity in Hong Kong".

Average annual levels of total respirable particulates (TSP), furthermore, exceed standards in a number of measuring points, while both TSP and nitrogen oxides often exceed maximum daily objectives. In 1988, the EPD estimated that more than half of the Territory's population was exposed to unacceptable high levels of sulpher oxides, while it also noted that particulates were high over virtually the entire Territory and were a cause of health concern (EPD, 1989)(2).

In the late 1980s, the major sources of air pollution in Hong Kong were electric power plants, industry, and the transport sector. Over the past several years stringent air pollutant controls have been imposed on the power sector (e.g., mandated use of low sulphur, low ash coal for coal-burning power plants, electrostatic sprecipatators, and more recently flue gas desulphurization, and for oil-fired peaking plants, nitrogen oxide reduction systems. In addition, part of the planned expansion of electricity generating capacity has been shifted from coal to natural gas. In the industrial sector, the use of high sulphur heavy fuel oil was banned in mid 1990, leading to a significant drop in sulpher oxides and a modest drop in particulate levels in industrial areas (EPD, 1991).

The fact that the air quality of Hong Kong is still far from desirable has highlighted the need to reduce emissions from the transport sector as well. Indeed, for the vast majority of people in Hong Kong it is transport-related air pollution which is probably the most apparent immediate and potentially health damaging form of environmental degradation they individually face each day (Barron and Leung, 1991). One factor is that in many areas traffic congestion (with diesel buses, trucks, and taxis idling their engines) occurs in areas crowded with thousand of pedestrians and additional thousands of office workers in adjacent commercial buildings.

Motor vehicles in Hong Kong are estimated to contribute about 45% of the fine particles and about 75% of the nitrogen oxides emitted to the air in the Territory (EPD, 1991). These emissions stem overwhelmingly from diesel vehicles, with public transport playing the major role. Hong Kong's options for dealing with these problems relate largely to diesel vehicle fuel switching and diesel emission clean-up. This reflects the limited near and mid-term potential in Hong Kong for such other basic

options including (after Barron and Leung, 1991):

1. reducing demands for transport services,
2 altering modal choices, or
3. improving fuel efficiency.

Although Hong Kong has already achieved a degree of reliance on public transport in general, and on electric rail transport in particular, which would be enviable in virtually any other major urban centre of the world, one important consideration is that over two thirds of all public transport is by road rather than rail, with taxis accounting for nearly one fifth of those road public transport journeys (Hong Kong Government, 1992). Virtually all of these vehicles are diesel. In addition, goods vehicles (again overwhelmingly diesel) are often a major contributory factor in traffic congestion. Hence, diesel light and heavy buses, taxis and goods vehicles represent a principal target for environmental planning in the transport sector of Hong Kong (3).

While heavy buses and trucks represent a substantial part of the problem, EPD chose first to attack the problem of the lighter diesel vehicles. The reasons were twofold. First, the worst of the traffic emission health impacts are believed to occur in the side street of commercial areas and larger vehicles are often banned from these. Second, while heavier diesel vehicles make rather unattractive candidates for switching to alternative energy systems under existing technology, this is much less of a problem with lighter diesels (Leung, 1991).

In 1990, EPD proposed requiring new lighter vehicles to be gasoline fueled with catalytic converters. In preparation for this, unleaded gasoline was introduced into Hong Kong in 1991 and, beginning in January 1992, all new gasoline-fueled vehicles were required to have catalytic converters. These moves in themselves had rather modest environmental benefits for Hong Kong, since nearly all existing gasoline-fueled vehicles are private, and as noted above such vehicles play a relatively minor role in Hong Kong's transport picture (4). However, they were necessary steps in providing an in-placed relatively clean fuel system when the planned gradual shifting of lighter public transport and goods vehicles, away from diesel fuel was to begin in 1993.

The other basic option, of course, is direct reduction of diesel exhaust pollutants. A well tuned diesel vehicle can have emission exhausts which, while different in composition from those of gasoline vehicles using catalytic converters, are generally comparable (or better) in terms of overall environmental concern (see Table 1) (Barron and Leung,

1991)(5). The major advantage of the gasoline fuel and catalytic converter system is its high reliability over much of its normal life (e.g., 80,000 kms) so long as it is used with unleaded fuel. In contrast, present technology for equivalent low-emission diesels require relatively frequent maintenance. This consideration potentially has major implications for implementation of a practical emissions reduction programme.

In large part, the major contribution of diesel vehicles to Hong Kong's air pollution results from government's inability to ensure that the majority of diesel vehicles are properly tuned. It is this uncertainty about the ability to enforce adequate maintenance which EPD considers diesel's greatest drawback in terms of practical emissions control efforts, as distinct from questions of theoretical potentials.

Against this risk must be weighted the expected lower costs, relative to the fuel switching, of a stringent emission standards and frequent inspections programme (e.g., 2 to 4 times a year). The fuel switching option would add about 15%-25% to the total cost for acquiring and operating the subject vehicles. The emissions standards and testing would be much lower in terms of direct costs and, even accounting for associated maintenance expenses, it would presumably still be substantially cheaper than fuel switching (Barron and Leung, 1991).

Table 1: Major Expected Tradeoffs Between Fuel Switching and Disel Inspections

	Strict Emmission Standards and Frequent Inspections	For Smaller Disels Switch to Gasoline with Cat. Converters
Cost / Energy Impact		
Approx. Cost Penalty	US$ 60 per year for Inspection Costs	Approx. 15 to 25% higher fuel costs
Approx. Energy Penalty		Approx. 10 to 20% increase in energy use
Net Emmission Impact	*Note: Risk of inadequate implementation*	
CO_2	Small Reduction	10 - 20% increase
NO_X	est. 45% reduction	est. 55% reduction
RSP	est. 60% reduction	est. 40% reduction

Source: Barron and Leung, 1991

Environmental policy setting occurs, of course, within the larger context of overall governmental policy. EPD's plans for fuel switching drew the attention of the government's anti-inflation fighters in mid 1991, who then did their own review of the higher monetary cost versus environmental risk tradeoff of the light diesel vehicle fuel switching option. In June of 1991, The Planning, Environment and Lands Branch (the policy arm of the Hong Kong Government which oversees EPD) acted in concert with the Finance Branch to block the planned diesel fuel switching and in its place supported an up-graded diesel emissions standards and inspection programme. The policy arms of government argued that this would be a more cost-effective (and less inflationary) way to reduce emissions of sulphur dioxide, particulates, and nitrous oxides. EPD, however, fearing that it would be unable to ensure compliance with a stringent inspection programme initially continued to urge the higher policy levels of government to reverse their position.

EPD has shown a strong predisposition toward fuel switching in a variety of fields (e.g., industry and the power sector), primarily because such regulations are relatively easy to enforce in comparison with process changes or end-of-pipe clean up requirements, and hence run less risk of noncompliance (Barron, 1992). Typically, EPD uses two criteria as screening devices for evaluating alternative environmental control measures (e.g., fuel switching, testing and standards, mandating specific process changes, emission taxes or permits). Namely, the measure likely to be reasonably effective if properly enforced (e.g., is it strong enough to meet the environmental goals?), and whether EPD (or its contractors or other enforcement agencies) are capable of monitoring compliance with the requirements of the control measure sufficiently well to ensure that emitters are not tempted to cheat.

In effect, the policy arms of the Hong Kong Government in this case overrode the EPD screen with their own screening criterion - i.e., whether the candidate pollution control measure are sufficiently cost-effective so as not to run counter to government's inflation control (or other macro-economic) goals of the time? As for EPD's concerns about the risk on non-compliance, the higher policy arms of Government either found such risks to be acceptable, or concluded that EPD had overstated compliance difficulties with the standards/inspection approach (Barron, 1992). As of mid 1992, EPD has apparently abandoned its diesel vehicle fuel switching plans, though it continues to be less than enthusiastic about relying on emissions testing.

Over the longer term, other clean fuel options such as Compressed Natural Gas (CNG) may deserve careful consideration (6). Eventually, there may possibly be an important role for electric battery vehicles in bus (and other) fleets, though probably not for a major share of private vehicles or taxies until substantial breakthroughs are made in technology (7). Perhaps a more relevant form of 'electric vehicle' for Hong Kong is the expansion of the existing electric tram service and adding electric trolley buses. This option is being considered by EPD for the longer term (Leung, 1992).

One factor often left out of reviews and appraisals of transport options is the pedestrian option. Hong Kong already has an extensive system of raised pedestrian walkways to separate people from traffic where feasible. As noted above, most of Hong Kong is built into steep mountainsides. While distances between major residential areas and commercial centers in places like north central Hong Kong Island are often relatively short, the significant elevation change north and south discourages walking, while it forces motor vehicles to take long, circuitous routes. In 1993 a large outdoor escalator went into service. It is hoped that this system will encourage residents of parts of the Mid-Levels section of Hong Kong Island to take advantage of this non-vehicular transport option for commuting part or all of the way to and from work (8). If successful, it might be replicated in various locations on Hong Kong Island and in other parts of the Territory.

Conclusions

Hong Kong has already gone much farther than the major cities in the West in implementing mass transit systems in general and electric transport systems in particular. Yet, the transport sector continues to be a major source of air pollution due to the high reliance on diesel buses, taxis, and good vehicles, and the poor tuning of a significant share of these vehicles. This situation serves as a reminder that, while it is important critically to evaluate the appropriateness of adapting solutions from elsewhere, sometimes imported solutions do fit quite well. In other words, if Hong Kong's motor vehicle fleet come more closely to resemble those in North America, Europe and Japan (i.e., one primarily running on relatively clean gasoline systems instead of diesel), then the city's air pollution problems would be considerably reduced. Unfortunately, the implementation of this idea, like other major environmental measures of the early 1990s, has run afoul of the outgoing gov-

ernment's battle with inflation and the related concern with limiting competition (for funds, and other resources) with (in this case) its principal infrastructure development project - the new airport.

Whether an effective diesel standards and inspection programme will be implemented remains an open question at this point. As for more innovative solutions (e.g., the greater use of low speed electric surface rail or trolley-buses or greater attention given to facilitating pedestrian movement), these seem likely to remain victims of the types of fiscal constraints noted above, at least for the next few years.

The comments made here regarding the outdoor escalator, while not made to imply that non-vehicular travel is the wave of the future in Hong Kong, nonetheless suggest that perhaps the 'can-do/will-do' attitude which has long been a hallmark of Hong Kong is only temporarily on hold. Once the airport project is nearer completion, and if inflation is finally brought back into line, then it seems likely that innovative approaches to transport will surface once again, if only because even the best of the conventional approaches probably will not be enough to address the transport service and environmental needs of Hong Kong's future.

Notes

* A revised version of this chapter was presented as a paper to the Supercities Conference held in San Francisco in October 1992

(1) Private automoblie ownership in Hong Kong is only one motor car for every 27 persons despite a per capita income of $US14,000 (Hong Kong Government, 1992). Private motor car ownership accounts for 55% of all licensed motor vehicles, but these account for only about one fourth of all commuting journeys.

(2) A more comprehensive review of environmental problems and efforts at environmental management in Hong Kong may be found in Hills and Barron (1990).

(3) A high reliance on diesel vehicles is also common in much of Asia (and other parts of the developing world). Like the relative roles of public versus private transport, the diesel-versus gasoline engine mix is another feature which tends to distinguish the situation of the developing and newly industrialized parts of the world from those in North America, Europe and Japan.

(4) Still, it should be noted that the use of private motor cars in Hong Kong is not without problems. Despite substantial increases in the mid 1980s in private motor car license fees and other costs, the number of private licensed vehicles increased by 18% between 1989 and 1991. During this same period, the number of all motor vehicles rose 12%. Hong Kong's roads already have one of the highest vehicle densities in the world (Hong Kong Government, 1991). Clearly, recent trends cannot continue for long if the Territory is to avoid much greater congestion and associated air quality and economic impacts. Unfortunately, projections are for even further increases. To discourage growth in the number of private motor cars, the Government announced in May 1992 that it would annually increase the licensing fee (already very high) by 5% above the rate of inflation until 1996. And congestion issues aside, if the number of private motor vehicles keeps growing, then it is vital that future ones be cleaner than those on the road in Hong Kong today. While figures for air-borne lead in Hong Kong are not nearly so alarming as those in Bangkok and some other Asian cities, there nonetheless are disquieting indications of elevated blood lead levels in parts of the population and transport is suspected as a contributor (Siddall, 1991).

(5) This approach could also apply to both heavy and lighter motor vehicles. And some form of it for heavier vehicles probably will be imposed eventually.

(6) The Territory has no natural gas of its own. Pipeline gas supplies from China are still very limited and prospects do not appear promising for acquiring much more in the way of gas supplies through pipelines. However, Liquified Natural Gas (LNG) is an increasingly important fuel throughout the region and from this CNG fuel systems could be developed. LNG has been considered as an energy option for Hong Kong, but this will require a commitment by at least one very large customer (e.g., one of the two power companies) before LNG unloading and storage facilities could be justified. Once a base demand is found, LNG could successfully compete in various sectors (e.g., industry, home cooking [replacing town gas], and possibly vehicle fleets [in the form of CNG]. However, recent actions suggest that the Government would look unfavorably on an LNG facility before completion of the airport project as it could be viewed as competing for infrastructure resources (e.g., funds, labour, construction equipment).

(7) Battery breakthroughs have seemed just around the corner since the 1970s. Yet, despite renewed optimism and interest in the 1990s (now with an environmental rather than energy thrust) competitive free-wheeling electric vehicles remain an elusive dream.

(8) The role of the escalator (which will be nearly a kilometer long and cover an vertical distance of almost 200 meters, while passing over road traffic) as a commuting system is underscored by the fact that it will run downhill in the morning and uphill in the evening. This shifting one directional rather than a continuous two directional system was introduced as a cost-saving measure and its impact on the attractiveness of the system to potential users remains unclear.

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Chapter 9:

Prospects for City and Suburban Public Transport

Richard T. Meakin

Evolution of Hong Kong's Public Transport System

Introduction

Hong Kong is dependent on public transport to a degree almost unmatched by any other developed city. More than 80% of its motorised trips are carried by the public transport system which comprises a hierarchy of modes offering a full range of journey speeds, comfort, convenience and cost. Ten million passenger trips are carried each day.

The wide variety of modes has developed partly through evolution, and more recently through a process of planning. Under continual pressure, initially from uncontrolled population growth from successive waves of immigration and later through sustained high rates of economic growth, the public transport system has enjoyed steadily increasing demand. Unlike other cities, Hong Kong has not replaced its obsolete transport systems but has added to them new systems, superimposing the new on the old. Hence the MTR Island Line, completed in 1985, is duplicated for most of its length by Hong Kong Tramways which has been operating since 1904. Even earlier elements of the transport system survive, such as the Peak Tramway funicular and Star Ferry both of which opened in the 1880's.

Until the 1950s, the city remained compact, divided by the barrier of the harbour which could only be crossed by ferry. Dependence on mechanised transport was low as land uses were mixed, and trip distances small. The limited network and capacity of the public transport system perpetuated high urban densities. The only fixed track systems was the tramway along the Island north shore and a low frequency Kowloon-Canton Railway (KCR) service which connected a number of small market towns in the Eastern New Territories with the urban area. As the

population grew, the urban area expanded with a growing number of sizeable housing developments and squatter villages on the periphery. Buses were the only mode that had the capacity and flexibility to serve the transport needs of the newly developed areas.

The Need for Planning

In the 1960s, the capacity of the bus fleets began to fall increasingly short of the needs of the growing and dispersing population. Industrialisation meant the replacement of cottage industries in the urban areas with large factories on the fringes of the city. The new high density resettlement estates were also developed in the outer areas, while the beginnings of commuter travel created new demands which the bus system was unable to meet. The bus companies then, as now, were privately owned, and were operated in an environment of political unrest spilling across the border. There was, therefore, little incentive then to invest in new capacity, and no assurance that the investment would be profitable

There was, furthermore, no public transport planning process in place, though traffic planning was well established. The bus companies' regional monopoly franchises first granted in 1933 had been extended in 1960 on terms which gave Government greater powers of supervision over service adequacy and quality. However, the regulatory authority (the police) devoted minimal resources to monitoring operations so the monopolies put the operators in a very strong position to resist any government pressures to act against their commercial interests. The sanctions provided by the new legislation were never invoked. It was not until 1965 that a Transport Office and an Advisory Committee on Public Transport were established to improve service monitoring and development.

Informal Transport Modes

A network of illegal minibuses developed throughout the 1960's in Hong Kong in response to the deficiency of bus services. By the time government had recognised the political inevitability of legalising them in 1969, over 2000 minibuses were operating, carrying more than half a million passengers a day. After legalisation, Public Light Buses (PLBs) continued to enjoy freedom from government controls over their routes and fares. However, their proliferation, and the realisation that the city's road network could not accommodate an unlimited number of small unregulated minibuses which tended to concentrate in congested central areas, led to a ceiling being put on their numbers in 1976. By that year 4,350 PLBs were operating and patronage had risen to 1.5 million trips per day.

The franchised bus companies still enjoyed regional monopolies but remained unwilling to invest in capacity at a rate sufficient to meet demand. The 1960 franchises committed government to ensuring that bus operations were 'reasonably remunerative' to the franchised companies but bus fares then became a focus of social unrest in 1967, and the operators had no confidence that government had the political authority to raise fares to viable levels against organised opposition.

PLBs still present a difficult dilemma for government. They have often been cited as a successful example of demand-responsive public transport. Freed from administrative controls, they have played a vital role in maintaining mobility in Hong Kong, and still serve areas and routes inadequately or inappropriately served by other modes. They have also demonstrated a high degree of sensitivity to changing public transport market conditions, recognising long before the bus operators that there was a growing demand for high quality air-conditioned services at premium fares.

The cities of Europe and North America in the 1960s and 1970s saw substantial growth in dependence on private motor cars for urban transport, and a consequential decline in the viability and quality of public transport. As a result, public transport's market share declined substantially. Hong Kong, however, escaped these trends, partly because disposable incomes were not yet at a level that permitted widespread motor car ownership. Passengers were largely captive, and bus occupancy was very high. Because increases in bus service capacity lagged behind demand, Hong Kong's bus operators remained sufficiently profitable not only to be viable but to pay royalties to government.

Development of the Transport Planning Process

Sectoral Planning

By the late 1960s, there was a growing international realisation that the increasing reliance on private motor car-use and the consequential decline in public transport was not sustainable. Policies to halt the decline of public transport in other cities took many forms; subsidy, improved access to captive users such as the elderly and disabled, priority use of roads, a resurgence of light rail systems, and of course a range of policies to restrain the use of private motor cars in cities by fiscal and physical means.

Transport planning in Hong Kong was at that time undertaken on a sectoral basis, with roads and public transport being considered sepa-

rately. Road planning was well coordinated with land use planning, but planning of bus services was still very basic. There was no effective way to commit the bus companies to invest in the resources necessary to realise government's plans for bus services to developing areas.

The first assessment of the performance of the public transport system and evaluation of options for its future development were made in the Hong Kong Passenger Transport Survey between 1964-1966 (Road Research Laboratory, 1967). It revealed widespread service inadequacy and overcrowding, especially in the fast growing areas of Kowloon, and poor quality and reliability of services.

A road development programme had been defined in the 1966 Long Term Road Study, and had been revised periodically. Construction of a network of major highways was proceeding through the urban areas and around the New Territories where a number of New Towns were already developing.

The need for, and the viability of, a mass transit railway in the urban area had been established in 1966 by the Mass Transport Study (Freeman Fox & Wilbur Smith Associates, 1967), and a preliminary alignment had been identified. By February 1969 (see Freeman Fox & Partners, 1970), government projections of the growth in demand for public transport had concluded that only a mass transit railway (MTR), largely underground, could satisfy passenger demands into the 1980s. Detailed planning, costing and design then followed. It was realised from the outset that to reach its initial target patronage of 1 million trips by 1981 the MTR would need a high market share within its corridor, and a large number of 'ride-in' feeder trips. A network of feeder bus and minibus routes was essential for MTR's viability to become the backbone of Hong Kong's public transport system.

These three sectoral studies were undertaken in parallel, using common data, and were complementary. They were, however, essentially separate and their findings were not compiled into a comprehensive plan coordinating the elements of land use planning, transport infrastructure development and public transport development. There was also no comprehensive statement of government transport policies.

A Need for More Comprehensive Planning

The need for a more comprehensive approach to the transport planning process for Hong Kong was demonstrated in 1972, when projections based on the 1971 Census showed population growth to be considerably

less than previously estimated. There was also a need to assess the effect on travel patterns of planned transport links and major new town development plans for the New Territories. Transport investment priorities needed re-ordering for input to the continuing review of the Hong Kong Outline Plan (Hong Kong Government, 1969). A comprehensive study of Hong Kong's transport requirements was clearly essential. It would review and coordinate plans derived from earlier sectoral studies, and test these against different land use, population distribution and development options.

Policy options derived from the recommendations of the First Comprehensive Transport Study (CTS I) (Transport Department & Wilbur Smith Associates, 1976) were presented for public discussion in a Green Paper on transport policy in 1974. It was five years before these evolved into a concrete statement of policy in the form of a White Paper.

The White Paper entitled 'Keeping Hong Kong Moving' (Hong Kong Government Secretariat, 1970), framed three principles which were to guide the development of Hong Kong's transport system through the next decade:

1. Improvement of the Road System
2. Expansion and Improvement of Public Transport
3. More Economical Use of Roads.

Improvement of the Road System - Plans to realise the first principle were already well established, based on a road construction programme defined by the Long Term Road Study (Freeman Fox, Wilbur Smith & Associates, 1968) by the time the White Paper was published. A large part of the road programme was related to the development of the new towns; linking them with each other and to the urban area. The remaining projects comprised new high capacity roads and tunnels to increase capacity along established urban and suburban corridors. Use of traffic management techniques, including Area Traffic Control, to enhance the capacity of existing roads also formed part of this policy.

Expansion and Improvement of Public Transport - The major components of the improvement to public transport would be the construction of the first two lines (the Modified Initial System and the Tsuen Wan Line) of the MTR, and the electrification and double tracking of the Kowloon-Canton Railway (KCR). Few specific objectives were set out with respect to bus services, despite their persistent inadequacy and the prediction that they would remain the largest passenger carrier for the next fifteen years. General objectives for bus services were the reduction

of overcrowding and the improvement of service quality. Viability of the MTR, however, would be enhanced by lower quality and capacity bus services. Moreover, the bus operators were reluctant to invest in new capacity in the light of the future abstraction of traffic to MTR. Government then proceeded to commission the first of a series of transport network studies that would predict the effects of major infrastructure developments on the public transport carriers, and enable those effects to be managed and negotiated with the operators. These studies assessed the impact of each successive line of the MTR and the new tunnel crossings of the harbour.

More Economical Use of Roads - The most difficult element of transport policy was the third, euphemistically termed 'more economical use of roads'. It implied the imposition of restraints on use of the roads by the less efficient users, identified as private motor cars, and to a lesser degree taxis and PLBs. Priorities for use of the road network by road passenger transport were to be set with reference to the efficiency of each mode in moving people. Buses would be the main beneficiary of the policy and they would be afforded priority use of the roads. The role of goods vehicles in the economy also conferred a degree of priority on them, notwithstanding the inefficient structure and operating practices of much of the industry.

In 1981, Government commissioned consultants to undertake a study to identify and evaluate all potential bus priority measures (Mott Hay & Anderson, 1982). Implementation of many local schemes followed and extravagant claims were made of their effectiveness. It became obvious however that the density of Hong Kong's bus network was such that giving buses priority at one movement could impede bus speeds on other movements. The fundamental measure to restore bus speeds and reliability must be to ensure free-flow conditions throughout the road network.

CTS I predicted that, if registration fees were maintained at their current value in real terms the number of motor cars would triple between 1973 and 1991. It was calculated that licence fees must increase at a rate seven times faster than average incomes to restrain motor car growth to a level of 2.3 times that of 1973 levels, which, depending on population distribution and the degree to which the road construction programme was implemented, might be accommodated within acceptable levels of congestion.

The fundamental principles that motor vehicle growth should be contained to a level within the capacity of the road system and that the only

practical means of constraint were fiscal were thus established. In the light of the CTS I recommendations, the first fiscal measures specifically intended to slow the growth in ownership of private motor cars were introduced in 1974, taking the form of a substantial increase in licence fees. The impact of the new charges was amplified by the economic effects of the Oil Crisis, and a fall in the number of motor cars in use, though not in private motor car kilometerage travelled resulted.

The deterrent effect was short-lived, however, and the number of licensed motor cars resumed an upward trend in 1975 at a sustained rate of about 10% per year, which exceeded the CTS I forecast of unrestrained growth. As a result, by 1981 the private motor car population had risen to 212,000 and traffic congestion had reached levels that severely hampered the capacity and reliability of bus and minibus services on which 70% of the population depended.

In May 1982, a second, more severe, round of tax increases was imposed on private motor cars. First Registration Tax and Annual Licence Fees were increased substantially to the extent that the annualised cost of owning and running a typical family motor car was increased by 35% in real terms. The impact of the increases was again, coincidentally, amplified by economic recession and political uncertainty about Hong Kong's future. The registered motor car population fell each month for almost four years, from a peak of 215,000 in 1982 to a low of 161,000 at the end of 1986 (see Figure 1). At their peak, in 1982, private motor cars and motorcycles accounted for 72% of the total motor vehicle fleet; by 1988 this share had dropped to 55%.

Government had for some time been considering restraint measures that might be flexible enough to apply differential deterrent levels for different times of day and locations. Deterrence by registration and licence fees restrained motor car ownership, but its effect applied indiscriminantly to congested urban areas and the rural villages alike. Electronic Road Pricing (ERP) could be used to vary the deterrent effect between different times of day and locations and it seemed to offer an appropriate scheme for Hong Kong's conditions.

However, it was against the background of falling motor car ownership that the government proposed a pilot scheme of ERP to evaluate the technology. The scheme was abandoned after concerted political opposition arose, based on fears that the system could be used to record drivers' movements, especially after 1997, and that it would be used by government as a device to increase revenue from motorists rather than to control

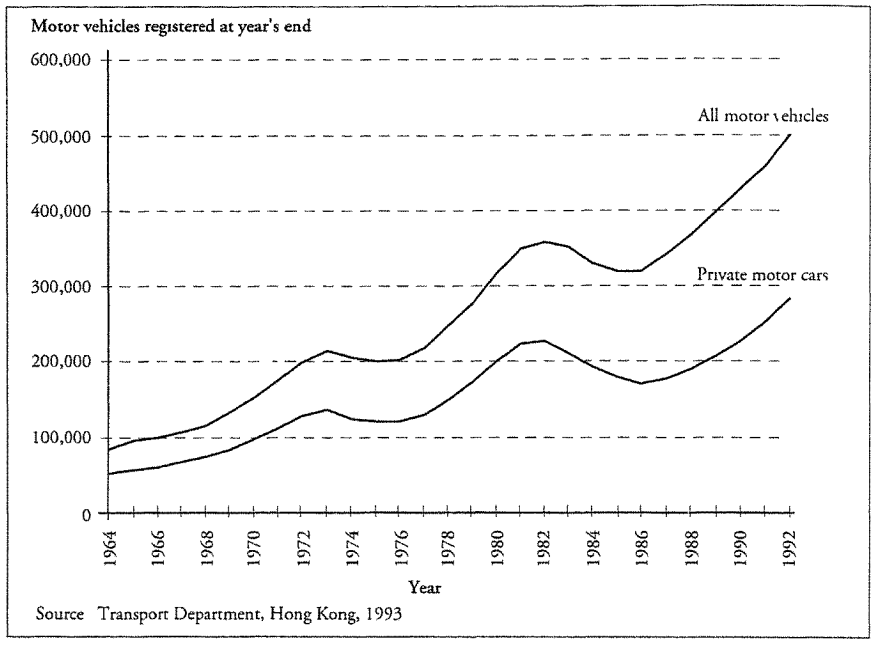

Figure 1 Motor car population in Hong Kong

traffic levels. The political hostilility to ERP meant that, until another flexible means of motor car constraint was identified, or the perceived disadvantages of the system were overcome, tax increases on the purchase and ownership of motor cars would continue to provide the main basis of the restraint policy.

In early 1987, the private motor car fleet began to grow again, and by the end of 1988 was increasing at a rate of about 11% per year, a rate which has since been sustained through 1993. The pressures on the growth of motor car ownership in Hong Kong derive from the rate of economic growth and hence real wages, population distribution, and the accessibility and quality of public transport links between places of residence and employment. Restraints on motor car ownership derive primarily from the costs of ownership and use, including parking. The number of people who have acquired driving licences, but do not own motor cars is an indicator of the potential underlying pressure. At present there are about one million holders of full current licences, and a further half a million whose licences are valid, but expired. The number of private motor cars, currently 250,000, amounts to only one per six licence holders.

Growth in motor car ownership continues to be restrained primarily by costs. Taxes on purchase and ownership have been increased annually to maintain their real value, whilst private sector costs of parking, maintenance, repair and fuel have increased at somewhat higher levels. Progressive improvements in the quality of public transport have also continued. The opening of successive lines of the MTR, and the modernisation and subsequent increases in capacity of the KCR mean that most large concentrations of population have high quality rail access to the employment centres. All minibuses and an increasing proportion of buses are air-conditioned, and bus capacity is generally adequate. Despite these restraining factors growth of the motor car fleet continues at an unsustainable rate of over 10% per year (see also Chapter 7).

The Public Transport Planning Process

The Planning Hierarchy

The process of transport planning in Hong Kong can be seen to have started in the 1960's with sectoral studies of roads, public transport and the mass transit railway, against a background where population growth and distribution, and public transport services were only partly under government's control.

In the 1970s, Government took major planning initiatives which laid the foundations of the present hierarchical planning process. The most fundamental was the decision to embark on a programme of development of new towns in the New Territories. These planning studies had to define the capacity of internal and external transport infrastructure and services. The direct relationship between demand for transport and the rate of development, population growth, and the distribution of land uses required a much more comprehensive approach to transport planning than had been necessary in the urban area.

The accuracy of the predictions of transport demand generated by the new towns could be expected to be high in terms of trip rates since population inflows were programmed. However, the planning studies overestimated the degree of self-containment that could be achieved in new towns, and therefore under-estimated the volume of external commuting. It also became apparent that the Government's powers of direction over the bus companies were inadequate to overcome their reluctance to invest in sufficient new buses to accommodate the relatively unprofitable tidal flow of commuters, to and from the new towns. The planning process also had to incorporate commercial aspects, particularly the effects of service expansion on the operators. Viability had to be assured and the likely frequency and size of fare increase applications forecast.

The need to plan the transport systems for the new towns from scratch meant that Government had to increase its transport planning capabilities in terms of the number and expertise of its staff. The bus companies also had to plan the acquisition of new buses and depots to meet service standards set by government.

Whilst the new towns required the design of new transport networks the opening of the successive lines of the MTR presented a more complex planning task. The bus networks had to be modelled in detail to assess the impact of the transfer of passengers to the railway. Feeder routes were also to be designed from areas where significant numbers of 'ride-in' MTR passengers were predicted. The actual changes in patronage were then to be monitored and the network adjusted to reduce bus capacity parallel to the railway and increase it to match feeder demand. The progressive transfer of passengers to the railway generated a continuous process of route adjustment, and produced a further enhancement of transport planning capability in which the bus, ferry and railway operators were beginning to participate.

In 1985, the responsibility for preparing the annual route development programmes was passed by legislation from government to the operators. This meant the companies had to equip themselves with a planning capability. The transfer enabled the government's transport planners to concentrate on the strategic and modal levels of the planning process, though they still retain some responsibilities for the companies' development programmes, such as ensuring their consistency with broader plans, checking their likely future impact on fare levels, and presenting the route network changes to the District Boards.

In the 1980s, the transport planning process became more sophisticated as the rate of change of the route network accelerated under the impact of population redistribution to the new towns, transfer of passengers to the railways and major investment in the transport infrastructure such as roads, tunnels under the harbour and hills, and railways.

Three Levels of Planning

The present hierarchy of transport planning in Hong Kong, comprising three levels thus developed:

1. **Strategic plans** - broad structural plans covering all, or a large part of the territory, with a planning horizon of 15 to 20 years (e.g., CTS I and CTS II [Transport Department & Wilbur Smith Associates, 1976 and 1989]).

2. **Comprehensive transport modal plans** - typically assessing the impact on the whole transport system of a major infrastructure development and specifying changes to the networks to accommodate it and preserve viability (e.g., the series of four 'Diptrans' studies commissioned between 1978 and 1984 to assess the impact of, and plan for, the integration of the successive MTR lines into the transport network and manage changes in market share [see Halcrow Fox & Associates, 1978, 1980, 1982 and 1991]).
3. **Development plans** - for individual modes of transport are commissioned when that mode undergoes a major development, or an accumulation of changes to the transport system require a reappraisal of its role, particularly to forecast and preserve its future viability. The ferry network, for example, has proved particularly vulnerable to the reclamation programme and the development of cross harbour bus and rail services. Several studies, including a series of three CHAPT studies (see Transport Department, 1987, 1989 and 1991) have been undertaken to redefine the ferry network and market share.

There are some 450 regular bus routes, 26 ferry routes, and 220 green minibus routes within the public transport planning process overseen by Government. Changes to these routes, and the design and introduction of new routes has to be done on a daily basis. Route development plans for the following five years are prepared annually by each bus and ferry operator using input data provided by government on changes in population, land use, economic trends and transport infrastructure development. Green minibus services are used to fill in niches in the network or in service quality, and these are allocated to operators through annual exercises. They form the lowest level (in terms of service scale) of the public transport planning hierarchy. If any other gaps remain they may be recognised and filled by the 3000 red minibuses who remain unregulated, and operate about 100 identifiable routes.

Future Prospects

Politicisation

The public transport planning process in Hong Kong is now well coordinated with land use planning and is highly sophisticated. All public transport operations are still by private companies, or in the case of the two railways, by public corporations operating on commercial lines. As always the process is evolving and three major new influences are emerging:

The first, is the politicisation of transport issues. The newly emerging political parties were quick to recognise the fundamental importance of public transport services to the community and the platform that transport issues provide. They have criticised and attacked the regulatory system administered by Government, regarding it as as a business partnership not conducive to the interests of users.

The processing of fare increases has, therefore, become highly politicised. The profit control schemes introduced in 1975 to give the franchised bus operators a direct incentive to invest in new capacity has been particularly criticised. Under the scheme, franchised bus operators were assured of a specific level of annual profit based on the value of assets invested. This acted as a trigger-mechanism for fare increases as profit margins were eroded by cost inflation. The scheme is being excluded from franchises as they fall due for renewal.

Fare increases will in future also be evaluated on qualitative criteria which will be very vulnerable to political initiatives to introduce equity elements into the fare determination process. Little experience has been gained yet of fare determination under the new scheme and it is not apparent whether uncertainty over future permitted levels of profit will affect the operators' willingness to invest in expansion and upgrading of rolling stock.

Segmentation of the Public Transport Market

Hong Kong's variety of public transport modes has always provided a range of service, offering a choice of levels of comfort, convenience, access, journey time and cost in most corridors. As the city becomes more affluent there is a trend for passengers to transfer to the faster and more comfortable modes (see Figure 2). One important element of comfort is air-conditioning. The initial resistance to the high fares of the MTR has now almost disappeared. In real terms the fares have remained almost constant but the progressive increase in MTR ridership, and surveys of MTR passengers, testify to the growing demand for premium levels of service at premium fares.

The PLBs, largely outside the formal transport planning process, were very early in perceiving this trend and were wholly air-conditioned several years before their regulated 'Green Minibus' counterparts. The bus companies, on the other hand, have been very slow to recognise the potential for premium services. At the end of 1992, even the more progressive of the two franchised bus companies had less than 10% of its fleet air-conditioned.

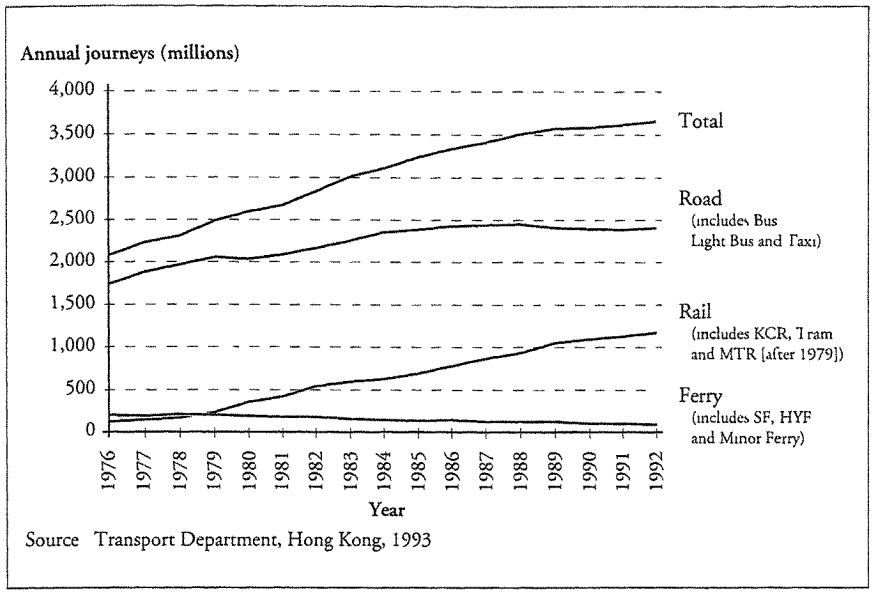

Figure 2: Number of passengers by public transport modes

This illustration suggests that the planning process is effective in predicting quantitative demand for transport services, but is insufficiently sensitive to qualitative factors. New planning techniques have been developed to ascertain users' preferences for different levels of service but these are not yet in use by local transport planners. At present, the demand for quality is assessed by reference to the relative usage of premium and ordinary services where a choice exists. Pressures also come through the political process, often presenting fares as the sole criterion in passengers' choice. Even though not everybody in the community can share equally in rising affluence, those that do must have their aspirations for higher quality public transport services satisfied or they will resort in increasing numbers to the least efficient modes of private motor cars or taxis.

Private Motor Car Restraint - Grasping the Nettle

The factors tending to increase motor car ownership, especially rising real incomes, are now strongly positive in Hong Kong. Even small increases in real income, especially for the middle income groups, result in large increases in the number of motor cars. Conversely, it is this group of 'marginal' motor car owners who are most sensitive to any increase in the cost of motor car use.

In addition to this, factors tending to suppress motor car use have probably declined relatively in the last few years. For example, no new rail systems will now open in Hong Kong until 1997 at the earliest, and at the time of writing this chapter the Airport Railway and Lantau Line (which will relieve the current shortage of rail capacity through the Nathan Road corridor and across the harbour) is still not certain to be built, pending agreement with mainland China on its financing.

The substantial new towns of Tuen Mun, Yuen Long and Tseung Kwan O in the New Territories are at present not served by rail links to the urban area, and are totally dependent on bus services, which are being severely affected by traffic congestion. While the quality of new buses continues to improve the enhanced levels of comfort are being off-set by decreasing reliability and service speeds due to more widespread and severe traffic congestion. Congestion also reduces the effective capacity of the bus fleets by extending journey times. This familiar downward spiral of deteriorating services will, unfortunately, add to the incentives to resort to the use of private motor cars in Hong Kong.

Tolerable Rates of Motor Car Growth

The CTS II Study, completed in 1989 (see Transport Department & Wilbur Smith Associates, 1989), identified the need to curtail the growth of the goods vehicle fleet, and private motor cars in particular, as a central policy issue. It recommended that the rate of growth of motor cars be limited to a maximum of 5% per year. Even this rate would exceed road capacity substantially in the long term but could be accepted over the next decade if controls were imposed on other classes of motor vehicles, especially on the goods vehicle fleet where the structure of the industry and operating practices result in low levels of utilisation. The means of private motor car control recommended were continuing increases in taxes on vehicle ownership. The study predicted that tax increases of 4% per annum in real terms would be required. Increases in fuel tax were cited as an alternative means to restrain vehicle usage. It was further recommended that the potential for adopting a scheme of road pricing be re-investigated including the 1985 ERP scheme.

Prospects for Electronic Road Pricing

ERP was the object of such hostility in the late 1980s that until recently few references were made to it by government as a potential solution to traffic congestion.

The Second White Paper on Transport Policy 'Moving Into the 21st Century' (Hong Kong Government, 1990) was issued to reflect the findings and recommendations of the CTS II Study. It contains only brief

and oblique references to 'area pricing' schemes, avoiding the term ERP altogether. It states:

> *"The Government intends to monitor closely the growth of private cars and to adjust car ownership taxes to contain it to an acceptable level, having regard to the rate of economic growth, traffic conditions and the additional traffic that can be absorbed by planned road projects."*

The future possibility of using road pricing , perhaps at a time when it might be better received, is referred to briefly among the 'major policy directions' in the following oblique terms:

> *"...retaining area pricing by modern devices as a long term option, keeping in view further development of the technology and its application to other cities".*

Four years have passed since the CTS II Study recommended that private motor car growth be contained to a rate of 5% per year. Licence fees have been increased annually to maintain their real value and deterrent effect, but taxation has not been increased in real terms as recommended by the study. Consequently the actual rate of growth has exceeded 10% in each of the four years.

The growth rate in private motor cars has been matched by increases in other motor vehicle categories, the largest being goods vehicles (see Chapter 11). The effect on traffic conditions of continued high rates of goods vehicle growth are very apparent. Recent improvements to the trunk road network have maintained average traffic speeds at an almost constant level, but conditions have deteriorated seriously on the parts of the network which were approaching saturation, such as the Cross Harbour Tunnel, Tuen Mun Road and much of northern Kowloon.

Governments failure to take measures to increase deterrents to private motor car use in part reflect changes in the territory's political system, especially the increasing influence of political parties in the Legislative Council. Traffic conditions have not yet deteriorated to the point where there is a universal consensus that stringent restraint measures are warranted, nor that those restraint measures should take the form of another round of tax increases.

Remedial action at present is focussed on local measures to manage traffic and enhance capacity at points of local congestion. Managing demand through increasing charges is not a principle that has yet found favour with Hong Kong's politicians. In 1992, Members of the Legislative Council did not support the government's initiative to reduce

traffic queues at the Cross Harbour Tunnel by increasing the Passage Tax nor to raise the tolls at government tunnels in line with inflation. The first measure was not pursued, while the second was reversed sometime after implementation.

The Hong Kong Administration is now making more frequent public references to the future inevitability of some form of road pricing but the politicians are non-committal. The public image of road pricing is still very negative. The fact that no other major city has made a commitment to ERP despite the technology having advanced sufficiently to protect the confidentiality of drivers' movements adds to local scepticism. Only when traffic congestion and its effects on society, the economy and the environment, become critical enough to reach the top of the political agenda is resolute action to restrain motor vehicle growth (particularly motor car growth) likely to find political support.

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Chapter 10:

Prospects and Opportunities for Light Rail Transit

Tim V. Runnacles

Introduction

Prior to discussing the experiences and potential for light rail transit (LRT) in Hong Kong it is appropriate to first define what is meant by such a system. One definition of LRT was given in 1976 by the American Transportation Research Board as follows (Shumann, 1989):

> *"Light Rail transit is a mode of urban transportation that uses predominantly reserved, but not necessarily grade-separated, rights of way. Electrically propelled vehicles operate singly (i.e., one car running alone) or in trains. Light rail transit provides a wide range of passenger capacities and performance characteristics at moderate cost".*

LRT offers a spectrum of electric rail systems ranging from moderately upgraded electric tramways to 'light metros'. Such systems may operate as conventional street tramways, or run on dedicated rights of way ranging from basic tram lanes to separate reservations at, above or below ground level. Many LRT systems display all of these characteristics in a single system.

Most LRT systems use single-deck tram type vehicles comprising a rigid or articulated car operated either alone, or with trailers, or in short trains of similar vehicles. The majority of systems feature simple tram stop type stations with ground or low platform boarding. However, several new systems have full height platforms to improve access for users generally and mobility-impaired people in particular. In Europe many long-established (and some new) systems feature cars with very low floors which provide excellent access without the need for platforms (see Chapter 4).

The normal definition of LRT excludes unmodernised tramways and heavy rail mass transit systems, although the boundaries are often indistinct. Similarly, the definition of LRT excludes fully grade-segregated and automated medium capacity urban railway such as London's Docklands Light Railway and Vancouver's 'Skytrain'system. Even so, these automated systems display many LRT characteristics, and perhaps only a purist would exclude their participation in the recent light rail revolution.

The Changing Fortunes of LRT

Light rail transit is logically the contemporary expression of the electric tramway, whose pedigree dates back a hundred years, and which itself evolved from the horse tramway which originated in 1832.

From the 1890s to the 1920s electric trams dominated urban passenger transport worldwide. The global total of exactly how many towns and cities had trams has not yet been tallied, but probably some 2000 such settlements had systems during the mode's first generation. Yet the tram's zenith was short-lived. The motor bus, the trolley bus, the motor car, the underground railway, and the suburban electric train were all pioneered within five to ten years of the first electric trams, and it was only because trams matured first that so many tramways flourished at all.

However, as cities rapidly grew in the 1920s and 1930s many authorities chose buses and trolleybuses rather than trams to serve the new suburbs, and when tracks and tramcars fell due for renewal it was all too logical to substitute the cheaper and more flexible buses. Motor traffic was growing steadily too, and the track-bound trams were seen as an impediment to traffic flow. Thus the tram's decline was as swift as its growth, and in the forty years between 1930 and 1970 over 85% of all the world's tramways were abandoned entirely, including such huge networks as those of London, Paris, New York, Chicago and Los Angeles. Most tram services were converted to buses, but some routes were replaced by underground 'heavy' railways which could handle larger passenger demands independent of congestion-clogged surface streets.

The closures were relentless, and it appeared quite probable that by the end of the 20th Century the electric tram would be joining the stagecoach and the steam train in extinction. Yet closer examination shows that the decline was not universal. Very few tramways were being closed in the former Soviet Union and its satellites. But, even if this aberration is explained for political and climatic reasons, the retention of trams in

Germany, Switzerland, Austria, the Netherlands, Belgium and other parts of Europe foretold the light rail movement that was to come. Faced with mounting traffic congestion many European cities were upgrading their trams, often putting central area tracks underground as the first stage towards developing a full mass transit railway.

Two major trends in the 1970s prompted light rail's present renaissance. First, the fuel crisis of 1973 demanded an appreciation of petroleum fuel conservation, whilst the emerging environmental movement stressed the value of public transport, and electric modes in particular. Various other movements reinforced the value of light rail, ranging from global economic recessions (which forced urban motorway and heavy metro schemes to be re-appraised) down to the specific need to re-equip the handful of surviving tram systems in the United States, which prompted public relations executives to coin the term 'light rail transit' in an endeavour to purge the streetcar's dowdy image. Developments in traffic management also helped: by the 1970s traffic engineers were increasingly awarding priority to public transport. This not only helped buses in scores of cities, but also reinvigorated surface tramways and urged reconsideration of expensive tram subway proposals.

If the change in light rail's fortunes was occurring in the 1970s, 1978 was a particularly significant year. The politically controversial closure of municipal trams in Hamburg and Kyoto in September 1978 marked the virtual end of tramway contraction. In the same year Edmonton in Canada opened the first all-new light rail system. Since then 40 more new networks have been opened, and the combined world total of first and second generation tram/light rail systems has grown to 331.

New Trends

In the twenty years since light rail's potential was generally recognized, development has not stagnated. The trend towards low-floor vehicles (see Figure 1) is now dominant in Europe and seems likely to spread. In German towns, trams are being integrated with suburban railways, and this too may become more general (see Chapter 4). A number of rival systems to light rail have also emerged, including rubber-tyred guideway systems which have a following in France and Japan, and the widely-reported dual-mode guided buses in Essen and Adelaide. All of these modes have a legitimate place in the transport scene, as do conventional buses, trolleybuses, metros, monorails and suburban railways. However, there is no denying that in the 1990s the most rapidly growing and evolving public transport mode is light rail.

Figure 1:
A contemporary low-floor European tramcar is shown here in the French city of Grenoble, where a new tram system was opened in 1987

In view of the theme of this publication, it is especially fitting that light rail is also widely regarded as a tool of urban regeneration, especially in decaying city centres. LRT systems seem to have a special magic in weaning motorists from their motor cars, and wherever new systems have opened far more people have used the new trams than ever used the buses they replaced. It is little wonder therefore that new LRT systems are being built in at least ten more cities, have been authorised in a dozen more, and are being actively planned in forty others on all five continents.

Light Rail in Hong Kong

Nobody who has lived in Hong Kong recently can be unaware of its contribution to the worldwide light rail renaissance, though it is regrettable that media commentaries sensationalised the early growing pains of the new system in Tuen Mun whilst ignoring its very positive achievements.

Hong Kong arguably has two light rail systems. Before considering the Tuen Mun - Yuen Long network, respectful appreciation should be paid to Hongkong Tramways (see Figure 2). Despite its reputation for

slow running and 'classic' equipment, HKT still operates the world's busiest single tram route. Its 347,000 daily rides make it the most heavily patronised surface system on Hong Kong Island's busy north shore. Short rides, low fares and high productivity characterise this exemplary people-mover system. Each of the 161 regular service trams carries over 2,000 passengers daily, or nearly three times the load of the rival buses (Transport Department, 1992).

It was the indispensable productivity of the trams that ensured their survival when other cities were abandoning their systems. Although the trams have occasionally been threatened with bus or trolleybus substitution, and were even forecast to be made redundant when the MTR Island Line opened, the ultimate conclusion was always that the trams should stay. Today the tram fleet in Hong Kong is as efficient as ever. All of the vehicles have been rebodied since 1987, and experiments are now beginning with quieter, smoother and faster acceleration and braking.

Figure 2: A Hong Kong Tramways' car on the Whitty Street turning loop. This car, No. 120, was uniquely rebodied in 1991 in traditional style as a contribution to Hong Kong's heritage

Over the years, some 45% of the system has been isolated from road traffic interference by the creation of physical reserves or gazetted tram lanes. This growth of segregation occasionally raises protests from motorists who would prefer to see the trams abolished and their tracks surrendered to road traffic. However, those who believe this should remember that each track can carry over 10,000 tram passengers per hour, whilst an ordinary traffic lane would handle, at best, a fifth of this number in private motor cars.

In the spectrum of light rail options, HongKong Tramways is close to the bottom end. On the other hand, the new Tuen Mun and Yuen Long LRT is squarely pitched in the mainstream of contemporary light rail development. The system owed its origins to the Transport Department's perspicacity back in 1973 when it secured an 'exclusive public transport right of way' on Tuen Mun's Outline Development Plan. Five years later, a transport study for the new town recommended that light rail should use these reserves not only because if would be the most economic system in the longer term, but also because it would not depend on oil fuel, it would be environmentally friendly and it would promote the image of the new town (see Figure 3).

Government accepted the light rail option, and shortly afterwards it was agreed to extend it to Yuen Long. Initially, it was envisaged that the new system would be run by the Hongkong and Kowloon Wharf and Godown Company Limited, which already ran HongKong Tramways. However, the property slump in 1982 created problems for both parties, and the Wharf Group withdrew its bid in 1983. In the same year the

Figure 3: A Tuen Mun light rail car is shown here operating on reserved track alongside Pui To Road in the town centre

Kowloon-Canton Railway Corporation (KCRC) was invited to consider the project, and agreed to do so in 1984. Tenders were let in 1985, and the first 23km phase of the system opened in September 1988. In November 1991, an additional line was opened in Tuen Mun, and two more routes were opened in February 1992. A branch line to Tin Shui Wai, under construction and due to open in early 1994, will bring the network length to 30.95 km.

Tuen Mun's LRT was conceived in the early years of the light rail renaissance, and the achievement it represents should not be underestimated. In early 1992 it carried nearly 250,000 passengers every day, which makes it several times busier than any other second generation surface level light rail system anywhere. Productivity per car is little short of amazing, with over 3,000 passengers using each car daily, although an additional batch of cars were delivered in the autumn of 1992.

It is well known that the Tuen Mun system had an inauspicious start following a number of accidents. The accidents were most unfortunate, but several valuable lessons were learned, particularly about the need to adapt European practices to local circumstances, especially local residents and motorists. Today, the LRT has a very good safety record, although inevitably there will always be some risk where public transport vehicles share the streets with other traffic.

Prospects and Opportunities for Light Rail

Trams and light rail vehicles together carry well over half a million rides daily in Hong Kong, although this is only about one ride in every 16 made by all modes. Given light rail's worldwide attention, it would be gratifying to report that there are numerous light rail schemes proposed. There are some, but it would be misleading to pretend that Hong Kong is likely to host a huge light rail network like that of Germany's Ruhr district. There are several reasons for this conservative outlook:

1. the best corridors are already taken, either by heavy rail (mass transit and suburban) lines, or by existing light rail routes;
2. the deeply entrenched role of the franchised buses and the heavy dependence on them limits the scope for light rail to compete viably in the same or similar markets;
3. the intense use made of the road system disfavours on-street alignments for new LRT lines;
4. the need to recover all costs, including capital costs, places a severe burden on any new rail system in Hong Kong.

Despite these impediments, the years to come should see some expansion in the light rail sector in Hong Kong. For example:

1. the Tin Shui Wai branch of the Tuen Mun - Yuen Long LRT system has recently been completed, and may eventually be extended to form a loop round the new town;
2. a northern bypass line in Yuen Long has been proposed, and could be opened in the middle of the present decade;
3. two further extensions within Tuen Mun have been identified, from Pui To Road to Sam Shing, and from Sam Shing southeastwards to So Kwun Wat.

On Hong Kong Island, the tramway company developed a plan to build a loop line around the future Aldrich Bay reclamation, and discussions with Government on this line were in progress in 1992. Although an integral part of the present system, the route would be laid on segregated track built to contemporary light rail standards. In addition to this, Government consultants have recommended a reserved track tram route on the Central and Wan Chai reclamation, and also to Green Island.

In Kowloon, a tram network was proposed as far back as 1913, and although the peninsula is unlikely ever to see street trams, proposals were made in 1990 for an elevated light rail line from Hung Hom to the China Ferry Terminal Via Tsim Sha Tsui. This proposal, known as 'Kowloon Sky Rail', received strong commercial backing but encountered stiff opposition from the Urban Council which expressed concerned about the

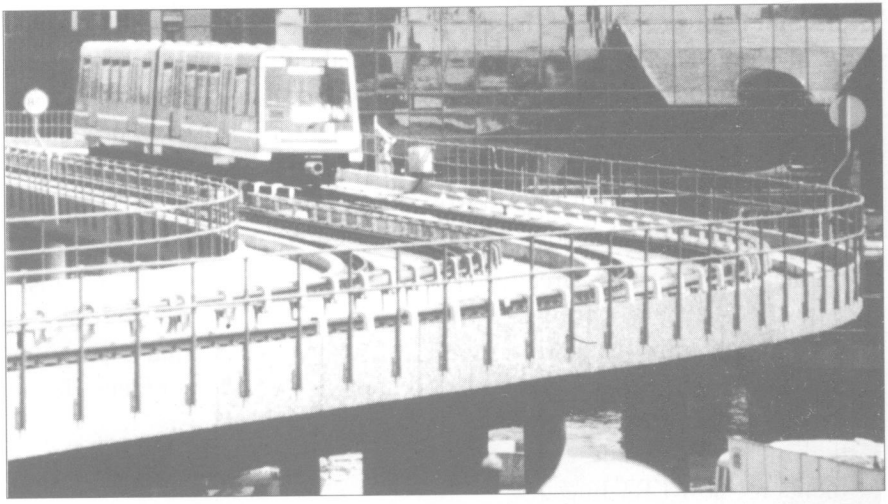

Figure 4: If it had been built, the Kowloon "Sky Rail" system would have closely resembled the Docklands Light Railway in London, shown here. Environmental concerns about elevated tracks derailed the proposal

route's impact on its amenities (see Figure 4). Apart from the Sky Rail proposal, consultants have also identified the opportunity to expand elevated light rail lines into Mong Kok, Yau Ma Tei and West Kowloon Reclamation.

Other light rail schemes have been identified but may have slimmer chances of realisation. In 1990, three separate consortia proposed light rail routes from Central to Aberdeen. However, all three would have required property development to offset their capital costs and all three schemes have been rejected, although a rail route to Aberdeen remains in contention as a longer term planning option. In the eastern New Territories, a reserve has already been created in the median of Ma On Shan Road for a light rail line to Ma On Shan. The KCRC has expressed interest in this, although at the present time it is envisaged that this might be used by a medium-capacity metro type line between Sai Sha and Diamond Hill.

Also in the New Territories, many residents and their elected representatives continue to hope that the light rail network will be connected to the MTR at Tsuen Wan. Whether this would be from Yuen Long or from Tuen Mun, and whether it would be light rail or heavy has yet to be decided, but such a line would be a very logical addition to the rail network.

Conclusions

In many respects Hong Kong is unique. Its light rail networks are the world's busiest in proportion to their length, although it is doubtful if they have weaned many motorists away from their motor cars, if only because motor car ownership is so low for such a relatively affluent community. Nevertheless, the existence of high quality public transport is an essential 'carrot' in discouraging automobile use, and in this light rail clearly has a role to play, here as elsewhere.

Ultimately, though, LRT is but one of a range of public transport modes which should act in concert to make cities acceptable places in which to live or work without relying on motor cars. By design or default, or perhaps a judicious combination of the two, Hong Kong can show that for the vast majority of its citizens it is indeed possible to live without motor cars. But we should not be complacent about this, because motor car ownership remains a prized aspiration of the upwardly mobile set. It is, thus, increasingly necessary for public transport to keep one step ahead of public expectations.

Postscript

This chapter was written in early 1992; since then global light rail progress has made further strides. Despite an almost world-wide recession, the total number of new (i.e., post 1978) systems in operation has now reached 47; a further seven are under construction, with another 54 planned. The trend towards low-floor designs now dominate new vehicle orders in Europe and is beginning to spread to the United States.

However, Hong Kong has not been so fortunate. A short 650 metres extension of the LRT system to Tin Shui Wai Town Centre has been completed and is due to open in early 1994, but other extensions are in abeyance, especially as the protective 'Transit Service Area' (which has been introduced to protect the LRT system from unbridled bus competition) was partially dismantled in June 1993 in response to intense lobbying by local politicians. On the other hand, the LRT system now has 100 cars in operation, and daily patronage exceeded 305,000 in September 1993.

Hongkong Tramways' proposed Aldrich Bay extension was rejected by the Secretary for Transport in the autumn of 1992. It is understood that this was on the grounds that buses and minibuses would be 'better', which strikes a dubious note from an environmental point of view. The Central and Wan Chai and Green Island extensions are still in contention, but whether they will fare any better remains to be seen. Ironically, it was environmental concerns which aborted the proposed Kowloon 'Sky Rail' proposal in 1993. The elevated tracks were regarded as being too environmentally intrusive, so local travel in Tsim Sha Tsui will have to be performed on the congested local street network for the foreseeable future.

It is now most unlikely that the Ma On Shan corridor will witness light rail operation in the near future. A second private enterprise proposal was developed for a medium-capacity metro route from Ma On Shan in 1993, rivalling the earlier proposal to build a line from Sai Sha to Diamond Hill. However, as both schemes would rely heavily on associated major property development, it seemed unlikely that either would progress any further than somewhat similar schemes for rail routes between Central and Aberdeen.

The Railway Development Study (Transport Branch, Highways Department & MVA 1993) excluded any possibility that Tuen Mun or Yuen Long would be linked by a light rail extension to Tsuen Mun, though it conclude in favour of a heavy rail link from Yuen Long to

Tsuen Wan. This, however, will have to wait its turn until a decision is made on the proposed Mass Transit Railway Corporation's Lantau and Airport Railway, which is itself a victim of political stalemate between Britain and China on the development of the replacement airport for Hong Kong.

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Chapter 11:

Visions of a More Motor Vehicle Dependent-Free Strategy

Harry T. Dimitriou

Hong Kong's Inherent Advantage

Of all cities in the world facing the prospect of excessive dependency on motor vehicles, Hong Kong is uniquely placed to provide a visionary response to the resultant urban transport problems. There are several underlying reasons for this.

Firstly, Hong Kong does not have a hinterland of any significance to finance. Most other cities of six million inhabitants (especially capital cities) are obliged to contribute revenues to support the rural hinterland or province in which they are located. This is especially so in Asia as urban areas typically contribute to more than 50% of this nation's GDP. This particular characteristic provides Hong Kong with a higher level of disposable income to spend on itself, and enables tax levels to be maintained at relatively low levels. The reduced expanse of infrastructure networks, by virtue of Hong Kong's compact size and high density character, together with the financially more viable services resulting from these densities, further enhances the productivity of the city.

Secondly, Hong Kong has a competent but nevertheless centralised administration. There are, of course, distinct disadvantages to centralised governments. However, regarding city and transport planning, it could be argued that there are also expedient advantages to this form of administration as the infrastructure achievements of both Singapore and Hong Kong suggest. Governments of this kind undertake public works with limited consultation and on the assumption that what is implemented is done in the interest of its economy and population. Given that there is little democratic content to the planning processes employed, minimum delays to government proposals are therefore experienced, providing they receive the support of the major economic players of the territory.

Thirdly, no other city in the capitalist world has the kind of control over its land use as Hong Kong. The city enjoys this advantage by virtue of almost all land in the territory being Crown Land. This places Government in a position to confer leasing rights to the private sector from which it collects both substantial rent and development premiums. It is on this basis that critics have argued that the Hong Kong Government has a vested interest in supporting the real estate industry over and above any broader land use/transport planning strategy. Notwithstanding this, urban transport planning and traffic management obviously require an understanding of, and influence over, the intricate interaction of land use and transport. The Hong Kong Government's potential 'hold' over land use planning provides its planners with a powerful advantage in any land-use/transport planning exercises it pursues.

Fourthly and related to the above, few cities in the world subsidise the housing of their inhabitants to the same degree as Hong Kong. Because almost half of Hong Kong's population currently resides in public housing estates (see Figure 1) with population levels and densities equivalent to, or even larger than, some new town developments in other countries, the Hong Kong Government can (and in fact does) situate a significant proportion of its population in locations of its own choice. Such estates are typically on the cheapest land so as not to occupy plots that could otherwise be developed by the private sector with higher financial returns which, of course, accrue to both the developer and (through the development premium) to the Hong Kong Government.

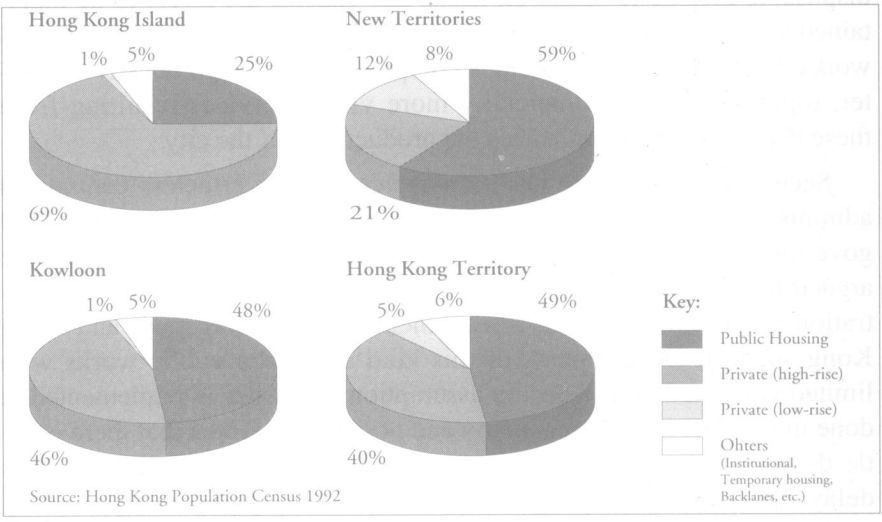

Figure 1: Population by type of housing

This choice by Government has immense implications for land use and transport patterns, as well as for practical planning responses. This is because the Government could, if it so desired, dramatically influence the land use component of the territory's land use/transport configuration in a very different way, given its pre-determining influence over the residential location of such a large proportion of its inhabitants'.

Fifthly, there is no other urban area with comparable per capita income levels that simultaneously has such low motor car ownership (1). The densities of Hong Kong's urban development (see Figure 2), furthermore, are such that they offer the highest corridor patronage levels in the world to public transport operators with monopolistic franchises. With government equity support, in the case of the railways, these public transport systems offer financially viable high-capacity services with excellent performance capabilities judged to be among the best internationally.

Lastly, but not least, by virtue of its recent dramatic economic growth, Hong Kong is ideally situated both to influence and gain from its strategic location in the backyard (or is it frontyard?) of China - the fastest economy in the world with the largest national population. Hong Kong's capability to influence China (and the Asia region at large) is at present greatly enhanced by its legal structure, its effective administration (currently under threat if large numbers of civil servants emigrate prior to 1997), its well managed and sophisticated infrastructure network, and its high levels of entrepreneurial and financial *savoir-faire*.

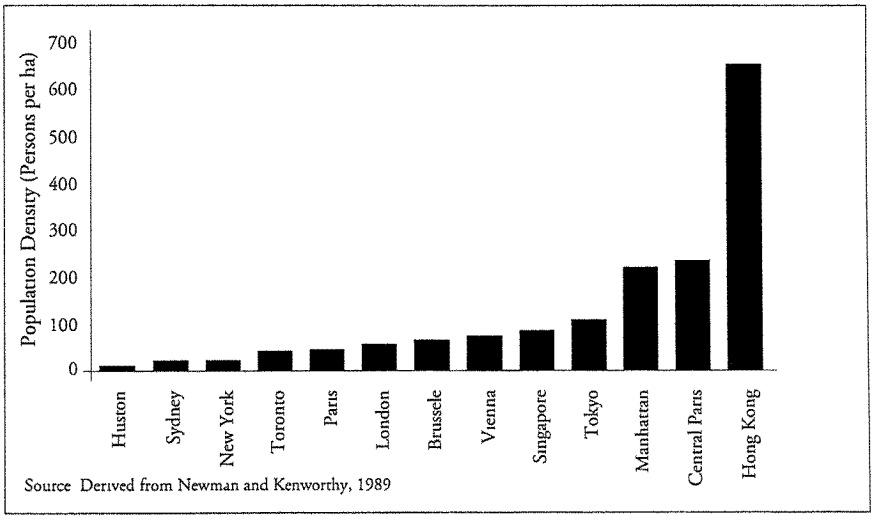

Figure 2: Urban densities of world cities

The above, and perhaps many more unique qualities of the city, provide Hong Kong with the potential to arrive at more innovative responses to urban transport problems than it has done hitherto. What the city has relied upon for the last twenty years are a series of engineering type transport studies that have drawn from the technical experiences and 'solutions' of countries elsewhere in the world with very different development characteristics, and with dubious success (see Dimitriou, 1992).

The panel discussion reported in Appendix 1 gives an account of numerous views and ideas of leading transport specialists regarding possible responses to Hong Kong's transport and traffic problems that are less dependent upon motor vehicles. The chapter concludes with an account of the potential catastrophic implications of the city's failure to arrive at a new approach to Hong Kong's transport problems in the face of the pending increase in motorisation.

The Need for a New Vision

The numerous transport studies conducted to date in Hong Kong continually refer to the scarcity of land in general, and road space in particular. What they do not emphasise, however, is that good quality environments are similarly scarce resources that need to be cherished. There is, instead, an assumption that there is a greater obligation to accommodate projected motor vehicle growth (especially of freight vehicles) in order to sustain current levels of economic growth, than there is to protect the environment from the damage this accommodation may cause.

New highway infrastructure proposed for the territory is designed to meet a 152% increase in private motor cars and motorcycles between 1991 to the year 2001, and a 140% increase in goods vehicles by the same horizon date - with all the environmental problems this implies (Transport Department & Wilbur Smith Associates, 1989). The Hong Kong government could place environmental capacity limits on the infrastructure response to this growth, actively consider the option of not accommodating motor traffic growth above these limits, and switch more movement to rail as a matter of policy. However, the Hong Kong government instead favours a 'damage-limitation' approach to its highways programme which entails introducing remedial environmental measures after the construction of the extensive network of new highways.

The adoption of this less than satisfactory approach is to deny that Hong Kong possesses the building blocks of a more innovative approach to tackling its transport problems. The approach is one founded on the

premise that port related traffic, currently estimated at 20,000 vehicles per day (and projected to dramatically increase), should be accommodated at almost any cost. The inevitable result will be for mainland China traffic movement traversing the territory, to/from the port area, to increasingly dominate the territory's transport infrastructure network, as well as disrupt local travel patterns. This will be done in the fear that failure to foster economic growth may lead this traffic to be diverted elsewhere, to another competing port in the region. What is totally ignored, however, is any concept of limits to growth - both in environmental and physical terms.

Some visionary ideas and an alternative method of tackling the transport needs of Hong Kong on a more holistic and sustainable basis are what is required. This does not necessarily involve changing the whole land use/transport configuration of the city, which a heavy road investment programme of the kind proposed will in fact ultimately do. With the telecommunications revolution already well upon us, a more visionary approach can include explicit efforts at reducing the need to commute to work in the service sector by encouraging more 'home-based' employment with the assistance of new developments in computer technology.

In the context of motorised traffic growth, the pursuit of past trends, projected into the future as if they were policies, is a world-wide proven recipe for disaster. It is ironic that Hong Kong is embracing a transport strategy that moves towards a greater dependency upon the motor vehicle at a time when many other cities are in search of an alternative strategy, and when Hong Kong is the envy of other cities in terms of the inherent advantages it currently enjoys by virtue of its high public transport dependency and shorter trip patterns.

What then are the alternative visions that Hong Kong should consider? Findings of past research conducted by the author regarding international urban transport planning practise (see Chapter 7 and Dimitriou, 1992) identify two major areas of concern that need to be taken into account.

Negligence of Lowerarchy of City Transport Systems

The first concern is that past urban transport studies typically neglect the 'lowerarchy' of city transport systems, particularly pedestrian facilities and networks for other non-motorised modes. They fail adequately to appreciate how such networks best interrelate with other urban transport systems - an aspect which is very apparent in Hong Kong, despite the

provision of extensive elevated walkways in the Central Area. These walkways were primarily built to lead pedestrians to particular real estate centres of commerce and retailing so as to enhance their viability, and facilitate better the movement of motorised traffic rather than for the convenience of pedestrians. This neglect of the proper development of a lowerarchy of city transport systems exists in defiance of the fact that all city inhabitants need, and rely upon, this level of travel - be it in retailing areas, airports, seaports, bus terminals, railway stations - wherever.

The inadequate emphasis given to the pedestrian, particularly at the street level, is an important issue not only for Hong Kong but for most cities of Asia and the Americas, and to a lesser extent Europe. The problem of neglecting the 'lowerarchy' of transport systems in Hong Kong has two sources. The first concerns the initial employment of British design standards in the territory in the provision of urban streets which allocated a disproportionate amount of road space for motorised movement long before there were many motor vehicles in the territory. The second, relates to the technology-transfer of standardised packages of urban transport planning processes from the US which traditionally have not accommodated non-motorised movement, and have under-emphasised public transport in favour of private motor car travel.

In Asia, this insufficient emphasis on pedestrian needs is particularly significant given the low motor car ownership levels, high urban densities and large person-trip movements that take place often in confined urban areas. If one considers, furthermore, the extent to which non-motorised travel and affordable public transport is important to the urban poor in the region (estimated to reach 400 million by the year 2,000 in the ESCAP Region of Asia alone [see Dimitriou, 1993]) the problem takes on even greater proportions.

There is an added dimension to this concern, and that is that Asian cities have especially thriving streets that are an integral part of the social and economic life of a city. In Hong Kong, the most important of these streets are those that are either periodically assigned to pedestrian use for particular periods of the day (or week) as street markets (see Figure 3), and those which in effect have been 'taken-over' by non-vehicular activities by the sheer volume of pedestrian traffic and the audacity of street hawkers (see Figure 4). There are, furthermore, some mixed use streets used both by pedestrians and slow-moving motor vehicles with inevitable difficulty.

In Hong Kong, these street areas are neither well planned nor well integrated with other aspects of city development and its transport net-

work. Some are scheduled for redevelopment by the private sector and are therefore threatened with extinction. This in turn can lead to the further loss of public domain space and the creation of additional corporately designed areas intended to service client rather than public needs.

Figure 3: Street Market in Kowloon (Bird Street)

Figure 4: Street taken over by non-vehicular activities (Fa Yuen Street, Kowloon)

From this, one may conclude that the failure to plan for traditional streets and the non-motorised movement they carry, endangers the very heritage of the Asian city, and therefore its future quality of life. Hong Kong faces the possibility of repeating the mistakes of Singapore which demolished a large proportion of its old streets, and replaced them with newly redeveloped air conditioned modern shopping malls, not realising that in so doing it had also killed the very 'soul' of the city (2). In belated recognition of this, in the late 1980s, the Singapore Government hired consultants to advise on how it could be recaptured/recreated. The important fact that non-motorised movement, particularly in pedestrian areas, has a critical role to play in the balanced development of a city and its transport system is the same conclusion arrived at by the German cities experience (see Chapter 6).

Absence of Multi-Disciplinary Approach to Transport Planning

The second concern relates to the view that urban transport planning still awaits a true multi-disciplinary approach to the phenomena it is required to tackle, despite arguments to the contrary presented by many traffic and transport planners. This is not to say there are not major participants and thinkers within the field to have attempted a multi-disciplinary approach. Rather, the field appears to be held hostage to traffic engineering concepts of systems operations efficiency, and the economic fundamentals of economic growth and (perceived) cost minimisation. Both the CTS I and II studies for Hong Kong display such characteristics.

There are, however, other important considerations that need to be addressed. These include considerations of environmental impacts, the social well-being of city inhabitants, and the degree to which urban planning goals and policies are being successfully pursued/supported. Each of these warrant a much higher profile in the appraisal process of transport projects in Hong Kong than they are currently receiving. Failure to do this very easily and too often, leads to unexpected or undervalued externality costs which, in the medium or long run, may well outstrip the perceived engineering and economic benefits attained in the more immediate future.

A Developmental Approach

A preferred approach to planning for Hong Kong's transport needs is thus one that would first address broader areas of concern such as: pre-selected land use patterns, environmental protection goals, economic,

social and equity problems etc., and then seeks the most efficient and economic transport systems that service these needs. There is, in other words, a need to move away from the 'traffic accommodative approach' of urban transport planning towards a more socially and environmentally committed strategy - a 'developmental approach' (see Dimitriou, 1992). An approach of this kind for Hong Kong would replace the vision of the 'super efficient transport system' with the vision of the 'sustainable city' as the main driving force behind transport planning efforts.

In retrospect, perhaps the German experience which found both politicians and technocrats 'out of touch' with their public regarding their vision for the future of the city (see Chapter 2) also currently prevails in Hong Kong. In any event, the need to consider more innovative and sensitive approaches to tackling Hong Kong's transport problems are long overdue. These should go beyond standardised responses (such as road pricing), given the unique advantages it has that set it apart from most other cities of the world. Hong Kong could benefit by learning from the German experience and look beyond the perceptions of politician, technocrat and speculator by seeking the views of the inhabitants of the city as well.

Hong Kong has demonstrated its determination in the past not only to survive but to flourish by achieving economic growth and levels of urban development that have astounded the world. However, it is becoming increasingly apparent from other international observations and experiences that any vision of the future for the city based on economic growth alone is a severely limited one (see Newman, 1993). The time has come, therefore, to think more creatively about the kinds of transport systems that are both desirable and sustainably cost-effective for Hong Kong.

Hong Kong is fortunate to have a framework within which such an approach to urban transport planning can be employed - i.e., Metroplan: the Metropolitan Development Strategy for Hong Kong (see Hong Kong Government, 1990). This strategy requires, however, transport operators, together with the real estate industry, to service rather than pre-determine metropolitan development goals. This can only be effectively achieved by:

1. having many of the externality costs of urban transport internalised within the urban development appraisal process;
2. setting-up a metropolitan development agency with both 'political teeth' and a decisive profile, and thereby better positioned to contend politically with competing interests and inter-departmental differences;

3. introducing a hierarchy of transport technology whereby appropriate transport modes are selected for specified routes in accordance with their capacity, costs, engineering performance, energy requirements, passenger demand, the environment in which they are to operate, and surrounding terrain and topography conditions.

Transport policy and planning in Hong Kong is at an exciting juncture. If its policy makers are prepared to take on board many of the above challenges, and thereby change direction, Hong Kong's urban transport priorities can be effectively re-adjusted towards a more sustainable future. This would be a future that protects the environment and its infrastructure, as well as the interests of those who live and invest in the city. A visionary decision of this kind could address three fundamental needs.

The first, is to abandon past disjointed supply-side transport planning practises in Hong Kong. The second, is to rectify/alter the territory's land policy priorities, especially regarding land disposal practises, which are based more on fiscal considerations than city planning and/or environmental priorities and which generate, rather than resolve, movement problems for Hong Kong. The third fundamental need, is to develop a full balanced multi-modal transport and communications policy for the Territory that includes water-based means of travel and telecommunications which goes far beyond current pre-occupations with operational and capital investment issues of transport. A visionary response of this kind could help transform Hong Kong into a more sustainable model of city development for decades to come - not only for China and the Asia region at large, but for the entire world.

Conclusions

Failure to respond with a visionary transport policy begs the question as to whether Hong Kong would slowly (or perhaps rapidly) lose the inherent cited advantages it has over other cities in its transport situation, as urban development and suburbanisation spread northwards up to (and across) the border. Without a strong railway-based strategy, and restricted motor vehicle access to the central area, such trends would generate much higher levels of motorisation making Hong Kong more prone to the kind of pollution and traffic congestion levels that haunt other Asian cities.

Another interesting question warranting serious consideration (see Dimitriou and Fouchier, 1993) is the issue of what would happen to

Hong Kong in the event current cross-border restrictions on traffic are lifted after 1997, and what contingency action could be introduced to cope with this possibility? Clearly, the lifting of such restrictions has the potential of opening-up the 'flood-gates' of traffic into the territory from mainland China, overnight making redundant all previous transport planning assumptions for Hong Kong which rest on the premise that the traffic restrictions would remain.

A development of this kind would in effect end the 'separate planning' of Hong Kong from its hinterland in southern China, and more particularly the Pearl River Delta. Appreciating that it is this 'separate planning' that has up until now enabled the Territory to 'control' traffic at the low levels currently maintained, any change in these circumstances would not only increase the number of motor vehicles in Hong Kong but would also lengthen trip lengths and increase energy consumption. It would increase, furthermore, the competition for scarce urban road space, and inevitably produce more widespread traffic congestion - particularly in the central area.

Notes

(1) Historically, much of Hong Kong's transport was originally water-based with the majority of urban activity taking place within a quarter of a mile of the harbour. It is only in the last twenty five years that this configuration has changed - mainly as a result of mechanised means of travel.

(2) While it is important to appreciate that much of the quality of the 'soul of the city' and 'street life' is in fact created by persons living in poor quality environments and housing conditions in dire need of improvement, the 'bulldozer approach' to these problems can often be too drastic and erase this quality almost overnight, never to be recaptured again. There is then, a need for developers and urban designers to study the elements that contribute to the 'soul' of the city before areas are demolished or renewed, with a view to recreating or encouraging the development of similar qualities in future urban renewal efforts.

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Chapter 12:

Conclusions

Simon S.C. Chau and Harry T. Dimitriou

As many of the foregoing expositions show, in pursuing an increasingly motor vehicle dependent strategy, Hong Kong is unwisely and woefully following a direction which is self-defeating and environmentally destructive, both for the planet and all the Territory's inhabitants. It is, furthermore, an increasingly unjust strategy whereby the more affluent will become more mobile and the less affluent less mobile.

Margaret Thatcher, renowned for her hostility to public transport, succeeded in her decade-long reign as prime minister to turn the UK, which built the first railway and metro networks, into a land of motorway impasse. With admirable foresight and determination, however, a large portion of Western Europe (including Germany) turned away from the old motor vehicle-dependent North American model of the last two decades of this millennium, and again led the world with its 'people-centred' transport policy.

While the US itself is now waking up to the horror of its past excessive dependence upon the highway with remorse, and is now somewhat at a loss in its search for 'U-turn' possibilities, the nightmare it started is far from over. The Third World, with three quarters of the globe's population, is currently following this disaster-guaranteed model of more motor cars, more trucks, more roads, and more pollution. The poisonous quality of the air due to traffic emissions in Mexico City, Cairo and Bangkok are now legendary. In this part of the world, Bangkok probably deserves the dubious honour of experiencing the longest traffic delays, with its school children arriving home from school at midnight after being caught-up in city traffic jams, and Bangkok airport flight schedules being delayed when entire airline crews become caught-up in traffic jams day after day. Manila and Taipei are now beginning to rival Bangkok in such absurdities. No one should doubt Guangzhou's and Shanghai's potential to meet with a similar destiny.

To both see through, and break through, such insanity requires vision and innovative thinking - not more of the same response which helped create the problem in the first place. To make and take decisions that rely less - rather than more - on the motor vehicle requires tremendous conviction and courage on the part of politician and planner alike. This is not at present forthcoming in Hong Kong.

While it is easy to point to Europe - the Germans and Dutch - and argue that if they (with a strong motor car industry) were able to reverse this motor vehicle dependency, why not Hong Kong? As can be seen from the previous chapters, to opt for a 'people-centred' strategy in transport planning requires nothing less than a paradigm shift, involving transformation in the philosophy of life and world-view of cultures. People, recognising that collective well-being must come before economic growth, and the interests of industries and politicians. Hong Kong is clearly no way near such a turning point yet. When the motor car manufacturers have millions of dollars to spend on marketing, when none of Hong Kong's legislators ever bicycle to work, when most people are still dreaming of their first motor car, and when the 'motor vehicle first and pedestrians second' culture is taken for granted, any effort to switch the society to a 'people-centred' transport strategy is regarded as eccentric and unreasonable thinking.

Such are the forces against the changes required in Hong Kong. As explained in the previous chapter, the Hong Kong public is now enjoying the latent benefit of high road mileage growth and low motor vehicle increases of the 1980's, totally unaware of the disasters ahead, not to mention the true nature of the self-defeating situation. They see nothing fundamentally wrong in the 'motor vehicle-centred' approach, while government does not admit to the full implications of its current strategy. The day will come, however, when the situation will have to change. Four things probably will have to happen first:

1. local traffic will eventually deteriorate to impossible and unbearable conditions, forcing people to re-think seriously their choice of mode and government to introduce drastic measures to alleviate traffic congestion;
2. concrete and proven successful strategies will have been realised by other city governments which will serve as a role model for Hong Kong;
3. determined and persistent campaigning efforts and messages on the part of local 'green' environmentalists will finally be realised not to be the eccentric response to problems they were once thought to be;

4. a new generation of much 'greener' transport specialists, urban planners, and government officials will come onto the scene with more environmentally sustsainable concepts and implement policies to realise them.

None of these conditions are at present in place in Hong Kong, although each are beginning to happen, albeit slowly and quietly. There will come a critical point, when the inevitable turn takes place. And if that should happen in the not to distant future, Hong Kong will contribute significantly to the greening of this part of the world by encouraging China to take a 'U-turn' and adopt a 'people-centred' transport strategy itself, to the benefit of its 1.2 billion people and the planet at large.

By arguing that the old paradigm must and will go, there is a sane alternative, and as more people are convinced that this is both necessary and possible, thanks to the dedication of people with vision, our seminar in 1992 and this book will be proud to be able to accelerate this process, however humbly.

Appendix 1:

Transcript of Panel Discussion on Visions of Motor Vehicle Free Cities

Simon Chau, Hung Wing-tat, Peter Leeds, Christopher Lonsdale (Chairman), Rolph Monheim, Hans-Georg Retzko, Barry Robb, Nigel Wilson and Harry Dimitriou

Barry Robb: When considering what the ideal vision might be for the future of Hong Kong, one possibility is to create 'beads' of major high density land use activities of distinct types along the city's major railway network. If, however, one cannot afford to build the full range of railways required, then the city becomes, by necessity, rather heterogeneous in land use character. A greater mix of land uses can emerge creating a very much more organic and small-scale development as found in Shanghai. We can, therefore, have two distinct visions: one which involves a re-investment in the railways, the other which does not.

Hung Wing-tat: To my mind, a more visionary (utopian) city is one where you have motor cars underground, in fact all utilities and communications underground. Above this, one has floors of shopping where people just walk about free of any disturbance. This is the model being pursued in the planning for Central. The Hong Kong Government commenced planning the existing pedestrian and transport network in 1960. The question today is how best to 'massage' it to fit our new needs? Nobody really considered this until the late 1980s.

A lot of places have no plan at all. At the moment we do not have the full control of land use, especially in the New Territories. So it is a bit difficult for us to further investigate what kind of Utopia we want. The most that one can do in Hong Kong is to promote the mass transit as the backbone to the metropolitan area's development. This can, I believe, be supported by a mix of public transport in the city centre. I do not think we can follow Germany's example of pedestrianisation to the same extent.

In Hong Kong, there is a very low motor car ownership rate. It is probably one-tenth of Germany's or even less. Ten years into the future, one cannot say, but today there a lot of constraints. There is very little room for manoeuvre in terms of further reducing motor car ownership and usage. Whereas, German cities have a lot more room for manoeuvre - they can still reduce ownership levels by 30% or even 50% by merely promoting and improving public transport. In Hong Kong, however, most of the motor cars are engaged in productive money-earning activities - i.e., they are business vehicles rather than commuting vehicles. I suspect and believe that if one undertakes a survey of motor car use in Hong Kong with commuting as the only purpose, it would be a very low percentage, especially in the city centre. This is especially the case of taxis, which clock-up the most mileage in the city, or in the case of small vans which also undertake a very high percentage of urban travel.

We could, however, do a little more about pedestrianisation in Hong Kong. On Sundays, for example, there are opportunities to do something along the lines of the American experience. We have not managed our pedestrianisation very well in Hong Kong, especially in Central. We constantly, therefore, receive complaints about littering, hawking, the messes left within pedestrian areas etc. I would like to see much more pedestrian space provided in, say, Mongkok, and especially in residential areas. But then we do have a lot to do, to manage the pedestrian zone.

Christopher Lonsdale: When people talk about the above kind of issues, they seem to allow themselves to be constrained by the nature of the situation as it is, and therefore feel restricted by, and dependent on, the roads that have already been provided. However, roads (like other infrastructure) are constructed and managed by people, roads can therefore be changed by people. To do this, one needs new ideas and new directions, and this comes from vision, not from looking into the rear-view mirror.

Market research is concerned with looking into the rear-view mirror. If you are got to go forward, you need vision. In large part, the purpose of this seminar is to try to stimulate some people's vision of how we tackle our future transport problems and offer a vision of where we may go from here, where it may be possible to go from here, and decide what we want to be, and what we do not want to be constrained by. And then start thinking how we might get where we want to be.

Simon Chau: In Hong Kong, it is commonly believed that the bicycle is used for recreation travel rather than for commuting. This is not, however, the case.

I live in Tai Po. There are very good bicycle lanes provided in this new town and I have noted more and more people using the bicycle for all kinds of trips. Very often in the mornings, I cannot even find a place to park my bicycle. The bicycle lane is, furthermore, noticably more heavily used than before. What Tai Po shows is that where people are given a choice of travel mode, and if they can travel by bicycle safely and pleasantly, they will use this mode.

Incidentally, if cyclists were to be allowed to use the Eastern Island Corridor, it will take twenty minutes (door to door) to ride from Quarry bay to Central. This is faster than any other means of transport one can think of, including driving a motor car. There must be a message here.

Peter Leeds: Visions are all very well, but Hong Kong is Hong Kong. I think most people's vision of a perfectly functioning urban traffic system could never be created in Hong Kong; short of destroying the place and starting building its transport infrastructure networks all over again. But we have to be realistic and begin from where we are. Today, we heard much about many German cities which obviously have gone a long way in terms of both promoting public transport and restraining private motor vehicles, as well as doing good things in the field of pedestrianisation.

While Richard Meakin informed us to a degree what the Hong Kong Government's transport policy is, and assures us that this policy is pointing in the right direction, I personally do not see we have made all that much progress in many respects.

There has certainly been a lot done in terms of public transport, particularly from the late 1970s up until the late 1980s, especially with the building of the Mass Transit Railway (MTR) lines and the modernisation of Kowloon-Canton Railway (KCR). In 1982, a start was made on a very strong policy to restrain motor vehicles in the central area. A speech made in that year by the then Secretary for Transport, Alan Scott, was probably one of the best statements made by a government official in Hong Kong on transport policy that has ever been made. It was certainly much stronger than anything written in either of the White Papers (both preceding and following the speech).

It was a 'broad brush' type policy of simply proposing to increase the First Registration Tax and the Annual License Fee of Vehicles. It was, for

a while, immensely successful in reducing motor vehicle use. There are some, however, who argued that the measures did not really have any major impact because at the time they were introduced the Territory was within a period of economic depression anyway. Furthermore, new railway lines were also being opened simultaneously, which would be expected to contribute to a decline in motor vehicle use. Whatever the reason, there were two short periods when the number of motor vehicles actually declined. Since then, however, Hong Kong has not seen any real bold moves to tackle the motor vehicle traffic congestion issue.

In subsequent annual budgets, the Financial Secretary has increased the motor vehicle license fee and tax, little by little, to keep up with inflation as part of fiduciary measures, but not for broader transport policy reasons. Now many of us are saying that we really need to do this, and until the matter is tackled, Hong Kong is not going to be in a position to start anything more visionary.

Pedestrianisation is fine, but attempts to introduce it in Hong Kong has not been too good. A good example is Chater Road on a Sunday, but, of course, temporarily closing this road on a weekly basis brings complications as well. In an inner urban area with a very large population density, such as Hong Kong, one does not really have the same opportunity as other cities. There are just not the opportunities to take high risks and build additional road systems - not until the the number of motor vehicles are reduced in Hong Kong given the amount usage that we have.

Some have suggested that policy makers in Hong Kong have become complacent; there is much to suggest this. At present the city is still benefiting from the period when the capacity of public transport systems was increased substantially. Those who could remember what it was like before this improvement would today confirm that the situation is very much better than before. The new road construction, furthermore, has not made the traffic worse. Despite all the new railways proposed, not too much of this is new, nor will what is proposed significantly increase public transport capacity.

There is, therefore, an urgent need to get down to restraining the use of the private motor car and goods vehicles to make better use of the road traffic system. My vision for Hong Kong is to really get 'cracking' on the things that ought to be done, and can be done, about the motor vehicle. Once we do this, one can also start looking at other attractive aspects such as more pedestrianisation and a better environment.

What is stopping the administration from doing this is the same kind of point made about the German politicians - the Hong Kong politicians and administration are just out of step with the general public. Both senior administrators and politicians in Hong Kong perceive that motor vehicle restraining policies are not popular or will not be popular.

The motor car lobby is always very strong in every country, particularly among the affluent and influential. The automobile associations claim that restrictive policies on the free movement of the motor vehicle is 'unfair', and that everybody has the right to own a motor car. This view is seen by many as a natural aspiration. The motor car lobby and Government then hear District Board members saying "we don't like Electronic Road Pricing" which in turn bolsters the opposition to the scheme and increases the reluctance of government to "bite the bullet" and take some constructive thoughtful action. This situation is likely to become worse with more democratic participation.

Democracy is kind of buzz-word these days; it has almost become a secular religion, and to say anything against it is almost like writing a new chapter of the Satanic Verses. However, in some respects one wonders, particularly after seeing what happened in the Legislative Council in past budget debates, whether Legco is really capable of making and taking visionary decisions regarding the city's traffic and transport future.

Rolf Monheim: That is a typical comment of meetings like this. What we know are two things. Firstly, there is no difference between what we have advocated in Germany and what you have said for Hong Kong. Although Hong Kong does not have so many motor car drivers when compared to Germany, those that exist have very good friends in high (political) places. Secondly, the city of Zurich attained a formidable public transport system, not on account of the influence of the politicians or experts but as a result of pressure exerted by the public. The citizens of Zurich got the transport system they wanted because the city administration is much more responsive and close to the community. There are many examples where citizens are wiser than the experts in transport and environment related matters. Zurich is but one example.

Peter Leeds: I was targetting the politicians rather than the general public. The German (and Swiss) experience described is where the citizens took the lead and not the politicians. This is not what we have in Hong Kong, unfortunately. It seems as if the Hong Kong administration

has in the past been nervous of its own proposals, and is not able to market them well. It reacts too quickly to the first politician who says: "I don't like it". All policies of the kind we have been discussing need to be `sold' i.e., marketed to the public.

Again, unlike the German or Swiss experience, it is very unlikely here in Hong Kong that the general public is going to suddenly come out instantaneously in support of one or other new transport policy. Rather, it will look to some kind of guidance as to how best to do things. In this context, there may be several suggestions that could be made. The public then could respond to each one, and in so doing, indicate what they would like done. Once the Government has public opinion behind it, it is far easier to get things done.

Harry Dimitriou: Hong Kong has demonstrated in the past that it can dramatically alter its destiny through a great deal of initiative, hard work and risk-taking. This strategy has made Hong Kong the envy of many cities throughout the world. The time has again come for Hong Kong to re-consider its future from a different angle. One that places a higher value on the environment and the quality of life - i.e., aspects that typically gain higher currency with greater affluence.

Traffic forecasts suggest that a wrong direction has been taken somewhere along the line in Hong Kong's transport policy, and that therefore, some major policy turns are now due. One needs to look at international examples to note the kind of damage that excessive motor vehicle accommodation can incur. In Mexico and Athens, for example, when pollution levels got so high on certain days with high temperature, people actually volauntarilly left their motor cars behind rather than use them to commute to work. This kind of scenario shows that the right course of action is taken when it is all too late. How to avoid this outcome, and arrive at a far more attractive and livable scenario, requires vision and not the mere statistical projection of past traffic growth trends that current Hong Kong transport studies have emphasised.

Regarding pedestrianisation in Hong Kong - it is high time it is appreciated that streets are for people not motor vehicles. Throughout the Far East, the very life of urban streets are often its mingling pedestrians and their street-side stores and hawkers. Rather than seen to be an asset to the city such city scenes are increasingly considered obstacles to motorised traffic. There is, thus, a clear need for guidelines here that re-establishes the rights of the pedestrian and re-asserts the function of streets as urban spaces for a whole myrid of urban activities - not just movement.

Nigel Wilson: We have a situation in Hong Kong where MTR could have a "walk-in" and "walk-out" system, so that one railway trip can cater for the total journey. The MTR is getting a 70% market share for this kind of trip within Hong Kong's public transport system. This, however, drops away rapidly when one needs feeder support services. The MTR obtains a very much poorer percentage when trip-makers are in need of `feeder' services at both ends. Given the railway station is a `walk-in area' at both ends of the trip, people like to use the MTR despite its premium fare. The fact is that passengers pay the fares levied. Where the politicians come in is where they say: "But the passengers must have a choice".

We at the MTR do not begrudge people having a choice. It becomes a very fine balance, however, between what is providing a reasonable choice, and what in other ways is creating competition. Supporting road based public transport competition for the MTR is, among other things, causing more pollution and contributing to higher road accidents. One really needs to establish whether 'so called' healthy competition actually helps anybody.

Everybody is aware that peak loading of the city's transport system is created by the journey to work, especially in the morning. Some fifteen years ago, commuters would queue half an hour for a bus; it wasn't air-conditioned, it was dirty, and there were not that many alternatives. In the last ten years, however, people expect an air-conditioned train within two minutes. Expectations have really changed.

So standards have gone up with growing affluence. While I do not begrudge that either - in fact I think it very good - one has to ask whether it is an efficient use of public (and private sector) money to let everybody travel at exactly the same time they want, and in whatever mode they wish?

Approximately 9-10% of the total daily traffic on public transport as a whole is carried during the peak hour. The MTR is now catering for 20-23% of its total daily patronage during the peak hour. Although the system's capacity is generally available to meet the demand, except for the critical sections, this utilisation rate is not efficient. Government has found it necessary to introduce competing bus routes to relieve peak hour congestion. While this is clearly very helpful to the public, it must be asked whether this is the right answer given that it contributes to additional pollution and is running all day, even though the railway has surplus capacity off-peak.

The MTR see the introduction of staggered working hours or the concept of flexi-time as a better way of spreading demand, and reducing demand for alternative transport services. This would reduce both pollution and congestion.

Harry Dimitriou: Another alternative is to move people homes' closer to their work. It seems that a situation is increasingly in the making in Hong Kong whereby people live in one part of the city and work in another, thereby having to travel significant distances to work and back each day. These trends need to be arrested or better still changed.

Barry Robb: The described trends are probably more of a natural mechanism. Hong Kong land uses are remarkably dynamic. Most of the photographs we have seen today of Germany show buildings that are old and are well established. In Hong Kong, very many of the buildings have only been built in the last ten years. There is, in other words, a very much greater and dramatic rate of change of land use in Hong Kong.

Hong Kong builds 75,000 new living quarters every year. The territory therefore has about a quarter of a million people moving into new apartments each year. This excludes the movement into the accommodation vacated. Hong Kong might even have up to half a million people moving residential location each year. The territory has, furthermore, lost 300,000 jobs in the manufacturing sector since 1986. Employees of this sector have since moved on to another sector - primarily the service sector. But what the new locations are of these new places of employment is less well known.

There is a a misconception that land use is some sort of static concept whereas in reality, especially in Hong Kong, it is a highly dynamic concept. Mr. Wilson may be pleasantly pleased to learn that a significant number of these people have moved to places of employment immediately above MTR stations. It is very apparent that Hong Kong residents, when they have a choice of residential location, are exercising that choice by moving into a vicinity close to the MTR facility, particularly the Island Line. Hong Kong has, as a result, a lot more people living in Shau Kei Wan and Chai Wan areas than ten years ago.

Christopher Lonsdale: Is this rate of change described sustainable? Does knocking buildings down every ten to fifteen years, and building new ones, together with the energy and new materials required to do this, something that Hong Kong can continue to afford and keep on doing into the future?

Peter Leeds: It has always been the case in the past. A comment was made, I think in about 1880, by a visitor who commented on how very interesting Hong Kong was as a place but asked: "When it is finished, what will take place after that?"

Barry Rob: If that is the case, I cannot see where the problem is. For as Mr Leeds suggested, it is an unwillingness to tackle the problem that is the cause of the difficulties. All that the government needs to do to accommodate this growth is to increase the number of tram lines, for example.

Hans-Georg Retzko: Capacity, however, is only but one criterion. We have the same discussion in Germany. If you take the subway, it can carry 400,000 persons from one point to another. But in our country, there are only 40,000 persons who want to go from here to there.

Peter Leeds: In this type of seminar, it always makes me think of one critic of urban transport who always reverts to the issue of the optimum size of a city as the main underlying issue? This is a very important aspect when talking of utopian cities. It is especially significant in Asia when one is often dealing with populations of two and three million, or more. Ok, you can have pedestrianisation. If you are talking about a city sustained by, or heavily reliant on railways, you have to support this system in order to make it work. So on the one extreme, you have got cities like Tokyo with 30 million people travelling on 23 railways to the city centre; and on the other hand, you have got cities with 200,000 or 300,000 persons making rail trips.

We are, therefore, talking of very different types of problems. It seems, however, that they all start from a very fundamental framework - i.e., can we specify the ideal size of a city, so that it is both economically efficient and can support a good environment for everybody?

Christopher Lonsdale: There's been some work done in India recently, where investment has taken place in the villages to help them become sustainable places where young people can both live and work. This has created a trend for people in the city to move back to these villages. From this, we can see that the city cannot be seen in isolation but has to be seen in the context of their hinterland.

Hong Kong's problem, as we all know, is of course caused by China. People came to Hong Kong to get away from China and find better

employment opportunities. If it was not because of the problems in China, Hong Kong would not have six mullion inhabitants. What one observes in Thailand, and other places with big cities, is the same sort of problem - i.e., industrialisation taking place where land has essentially been taken away from its traditional use. The poor people living on that land are then forced to move to the cities, which in turn creates strong pressure on urban growth. The phenomena of large city growth needs to be looked at in a much much wider context.

Peter Leeds: You could now argue in Hong Kong that economically the trend is in the opposite direction, i.e., much of its industry is moving into Guangdong province. Whether this is good or bad has something to do with the argument of how big a city should be? Every year there are debates in Legco about growth. Usually its a discussion all about growth and little else. One thing that doesn't grow, however, is the size of the territory of Hong Kong. It is obliged to keep on packing in more and more people and activities.

Sometimes, looking at changes in policy adopted in Singapore can be useful. Singapore was at one time continuously growing; then they made a switch. The Singapore Government led the change in industry. It decided to pursue quality rather than quantity. Most of the 'cheap knock-about' industries were pushed into Malaysia and the islands of Indonesia. Singapore has managed to keep itself to a preferred physical size, in terms of industry and population, which fits the island. Perhaps Hong Kong should look at what Singapore has done and do something along the same lines, rather than pursuing growth in everything? There just is not the room in the territory for such a strategy.

Barry Robb: Hong Kong Government policies tend to assume everything will go-on growing. Although the economy is growing, there are a lot of aspects of life in Hong Kong which are not. There are aspects of mobility-space, for example, which are definitely not growing and this causes problems. I do not use the term 'congested' as I believe this to be a meaningless term.

The configuration of space in Hong Kong is at present functioning at its maximum practical level. There are many causes of changes in land use and land values. These in turn alter the demand for utilities and create a lag in development between land use changes and related utility and communication networks that serve them. The densities in Hong Kong are, furthermore, at least ten times higher than those in Germany, which

together with the much greater pace of change, contributes a totally different context to transport problems to those experienced in Germany.

Hung Wing-tat: What I would like to summarise here are the expectations of the citizens of Hong Kong, and what to consider when thinking of responding to their expectations.

In Germany, it is probably expected that the public focus will be on quality of living rather than economic growth. In Hong Kong, however, the pressing issue that most people are talking about is inflation and productivity. There is in other words, a fundamental difference between expectations of quality of life in Germany and in Hong Kong. I believe that as Hong Kong grows more affluent its inhabitants will have higher expectations of the quality of life, and that as a result, one ought to plan the city with this in mind.

More emphasis should also be placed on other uses of the road space, including for pedestrians. But then we do not have the policy directive from government to do this. It does not even suggest what emphasis is to be put on the pedestrian in our road network? In reality, Hong Kong has not planned its network for pedestrians adequately. Perhaps, the Government could address this concern in its next transport policy review.

Despite this, a number of experiments concerning pedestrian movement has been embarked on. These include the elevated walkways in Central and the newly constructed escalator from Central up to Mid-levels. The major concern about the latter project is its maintenance. There is, actually, talk of ultimately building seven such escalators in Hong Kong. Whether this finally materialises, of course, depends upon the success of the first escalator, and the cost of the others.

Rolf Monheim: It is very important to understand the difference between traffic saturation and traffic congestion. These are terms which have totally different meanings. Saturation, for example, implies that the maximum capacity of the transport system has been reached. A little more traffic added to this state creates congestion, which then means the capacity moves towards zero. In other words, you have to be very careful when moving up to the saturation level to avoid congestion. When this happens, the whole transport system can break down. In a place like Manhattan, for instance, everything can come to a halt. No one moves anymore. That is the very situation that should be avoided. We therefore have to think before it happens, and not afterwards.

Barry Robb: I am not too concerned about going over the top with transport demand causing traffic congestion. What I am more concerned about are the traffic flows over the last ten years in Hong Kong. They appear to be the same both for peak and non-peak hours; their composition, however, is very different. There has been a reduction, for example, in the proportion of motor cars, a significant increase in light goods vehicles, and (in some areas) an increase in heavy goods vehicles. Interestingly, though, this has led to a higher productivity value being extracted from the same road space.

Appendix 2:

Participants of the Seminar

1. Mr Gavin Coates
   Director
   Permacualture Asia Ltd.

2. Mr Richard T Meakin
   Assistant Commissioner
   Transport Department
   Hong Kong Government

3. Mr Chan Hing Tong
   Town Planner
   Planning Department
   Hong Kong Government

4. Mr Li Wing Kwong, Vincent
   Senior Town Planner
   Planning Department
   Hong Kong Government

5. Mr Tim V Runnacles
   Principal Transport Officer
   Transport Department
   Hong Kong Government

6. Mr Nigel G Wilson
   Railway Extensions Manager
   Mass Transit Railway
   Corporation (MTRC)

7. Ms Kathy Griffin
   Environment Correspondent
   South China Morning Post

8. Mr Barry D Robb
   Town Planner
   Planning Department
   Hong Kong Government

9. Dr E G Pryor
   Chief Principal Town Planner
   Planning Department
   Hong Kong Government

10. Ms Christine Loh
    Chairman
    Friends of the Earth
    Hong Kong

11. Mr Peter Illig
    Director
    Friends of the Earth
    Hong Kong

12. Dr Peter Hills
    Director, CUPEM
    University of Hong Kong

13. Dr Harry T Dimitriou
    Senior Lecturer, CUPEM
    University of Hong Kong

14. Mr Fergus Duncan
    Business Reporter
    Hong Kong Standard

15. Mr Christopher Lonsdale
    Managing Director
    Permaculture Asia
    Hong Kong

16. Mr Henry Morritt
    Campaign Coordinator
    Friends of the Earth
    Hong Kong

17. Mr Hung Wing Tat
    Lecturer
    Dept of Structural & Civil Engineering
    Hong Kong Polytechnic

18. Prof Gungwu Wang
    Vice-Chancellor
    University of Hong Kong

19. Mr Peter Leeds
    Former Commissioner of Transport
    Hong Kong Government

20. Prof C K Leung
    Head, Dept of Geography & Geology
    University of Hong Kong

21. Dr C C Chan
    Director,
    International Research Centre for Electric Vehicles
    University of Hong Kong

22. Dr Peter K W Fong
    Chairman
    External Affairs Committee
    Hong Kong Institute of Planners

23. Mr B F Will
    Dean, Faculty of Architecture
    University of Hong Kong

24. Mr Stuart Parkins
    World Wide Funds for Nature
    Hong Kong

25. Prof Tunney Lee
    Department of Architecture
    The Chinese University of Hong Kong

26. Dr C O Tong
    Department of Civil Engineering
    University of Hong Kong

27. Miss Choi Lai Fun

28. Mr Yu Chi Ming

29. Mr Lau Kin Kwok
    Planning & Marketing Executive
    The Kowloon Motor Bus Co., Ltd

30. Mr Raymond Leung
    Environmental Protection Department
    Hong Kong Government

31. Mr Mak Chai-kwong
    Senior Engineer
    Railways Division
    Highways Department
    Hong Kong Government

32. Ms Annie Cheung
    CUPEM
    University of Hong Kong

33. Prof Len Gertler
    Professor Emeritus
    University of Waterloo &
    Environmental Assessment
    Board
    Ontario
    Canada

34. Ms K Y Fok
    Passenger Marketing Manager
    Kowloon-Canton Railway
    Corporation

35. Mr Simon Chau
    Chairman
    Green Power
    Hong Kong

36. Prof Rolf Monheim
    Department of Geography
    University of Bayreuth

37. Dr William Barron
    CUPEM
    University of Hong Kong

38. Prof Hans-Georg Retzko
    Department of Transport
    Planning
    Technical University
    Darmstadt

39. Dr Uwe Nitschke
    Director
    Goethe-Institut Hong Kong

40. Ms Petty Lai
    Programme Assistant
    Goethe-Institut Hong Kong

Notes on Contributors

Simon S.C. Chau is Senior Lecturer at the Baptist College of Hong Kong and founding Chairperson of Green Power in Hong Kong

Harry T. Dimitriou is Senior Lecturer in Urban Planning and Transport Policy at the University of Hong Kong and Consultant to the World Bank

Peter F. Leeds was Commissioner of Transport to the Hong Kong Government from 1982 to 1987 and prior to that a senior administrative officer in numerous government departments

Christopher Lonsdale is an Environmental Consultant with Permaculture Ltd., Hong Kong

Richard T. Meakin is Transport Consultant to MVA Asia and the World Bank, and sometime Assistant Commissioner for Transport of the Hong Kong Government

Rolf Monheim is Professor of Applied Geography at the University of Bayreuth in Germany

Hans-Georg Retzko is Transport Consultant and Professor of Transport Engineering at the Technical University of Darmstadt in Germany

Barry Robb is a Senior Engineer in the Transport Studies Unit of the Planning Department of the Hong Kong Government

Tim V. Runnacles is Transport Consultant to the Hong Kong Mass Transit Corporation and sometime Principal Transport Officer in the Hong Kong Government

Nigel G. Wilson is Railway Extensions Manager of the Mass Transit Corporation of Hong Kong

Hung Wing-tat is Lecturer in Transport Engineering at the Polytechnic of Hong Kong

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Despite its excellent public transport system and substantial proposed additional investment in this form of movement, Hong Kong, like most metropolitan areas of the world, is increasingly plagued by traffic congestion. The majority of Hongkongers is, however, seemingly unaware of the cost of this congestion on its society, and the possible alternatives to currently pursued policies and resultant situations. Instead, the motor car is seen by the layman and many politicians alike as the symbol of success and good living, accepting any associated problems as the inevitable cost of 'progress' and affluence. Meanwhile many administrators and technocrats regard the provision of appropriately charged for additional road space as the ultimate 'solution' to urban (especially freight) transport problems.

As Hong Kong heads towards the implementation of what some consider to be an ill thought-out transport policy, voices with alternative ideas are beginning to emerge. One happy occasion took place in April, 1992, when the Goethe-Institut of Hong Kong flew in two urban transport specialists from Germany, and, together with the Centre of Urban Planning and Environmental Management of the University of Hong Kong, and Green Power (Hong Kong), held a one-day seminar with local and visiting scholars, green activists, government officials, public transport corporation managers, and public media representatives.

This anthology is based on the papers presented on that occasion. The fact that they cover a wide variety of themes related to city transport planning, representing two very different cultures and social realities, and presented on what Green Power consider to be the first serious discussion on alternative transport thinking ever to be held in Hong Kong, makes the text of this publication particularly useful and meaningful.

Harry T. Dimitriou *is a city and transport planner currently teaching and conducting research at the Centre of Urban Planning and Environmental Management of the University of Hong Kong. In addition to his academic work he has acted as consultant to numerous international development agencies and city and government authorities throughout the world, particularly in Southeast Asia and the Middle East.*

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