Walking Towards the Future

The First international Conference in Israel on Walking

21/4/2010, Suzanne Dellal Centre, Tel Aviv

Abstracts

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The Green Environment Fund
הקרן לסביבה ירוקה

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Opening Address by the Minister of Environmental Protection

I wish to congratulate you on the occasion of this conference, which places the spotlight on advancing two areas which I have dedicated my years as a public figure to promoting: the environment and road safety. Both these issues are of vital importance and high on the Israeli general public's list of priorities, and the interconnectedness of the two means that the whole is definitely larger than the sum of its parts.

A key component of sustainable urban planning is the development of public space, the main element of which is the street - intended first and foremost for the people who use it, that is, for pedestrians.

Pedestrians as we know, do not pollute or take up parking space. On the other hand, they create a lively street atmosphere and safe space which attracts additional pedestrians. They also contribute to commerce and local cultural and economic activity and they are the ones that make a city a pleasant place to live in. Urban development which guarantees high environmental quality cannot be achieved, without recognizing and giving priority to the urban streets and their quality.

Israel has the dubious honor of being a country in which the number of pedestrians injured as a percentage of all victims of road accidents is one of the highest in the developed world. Improving conditions for urban pedestrians through widening sidewalks, the creation of inner city pedestrian malls; planning crossings and traffic signals that give priority to pedestrians; high quality street design which affords shaded and pleasant surroundings to stroll in - these are measures which are not complicated nor prohibitively expensive. But they encourage increasing numbers of people to walk instead of driving cars, especially when it comes to traveling short distances, which constitutes the major part of urban travel.

Another significant factor connecting road safety and the environment is the quality of public transport. Public transportation is the complementary means by which pedestrians reach their destination. High quality public

transportation allows for urban developments which emphasize the street, enabling safe and pleasant walking while contributing substantially to environmental protection. Such design contributes to road safety too as bus and rail transportation has been proven to be far safer than private car use. Providing safe and accessible public transportation, while enhancing the centrality of pedestrians within the urban context, are a winning combination for sustainable cities, guaranteeing quality of life from both physical safety and environmental aspects.

I welcome the cooperation between the Ministry of Environmental Protection, 'Transport Today and Tomorrow' and 'Or Yarok' who work tirelessly to promote these goals.

P.M. Gilad Erdan

Minister of Environmental Protection

Opening Address

In comparison with many of the developed, highly motorized nations, Israel stands out for the worse with a high percentage of pedestrians injured and killed in traffic accidents. For many years this issue was not researched properly and clear reasons for this exceptional and disturbing position were not found. In 2006 the Ran Naor Foundation for the Advancement of Road Safety Research invited a panel of international experts on road safety to map road safety research in Israel, to explore its organization, ways of implementation and suggest priorities. The subject of road safety research on pedestrians featured high on their list of recommendations. The lessons were learnt well both by the Foundation and by the National Road Safety Authority. Since then, many research projects have been completed and more are underway and a clearer picture is now available. According to the available knowledge, data exists to suggest many possible countermeasures and a variety of such projects are under way. Among them are improved signing and treatment of pedestrian crossings, improvements in pedestrian safety on inter-urban roads, consideration of pedestrians at roundabouts, etc.

However, a consideration of the pedestrian at the strategic level is still lacking. Walking is an essential part of any trip. In developed countries it is estimated that walking constitutes between 15 to 25 percent of all trips. In spite of this, no urban transportation plan in Israel treats this segment of activity explicitly and properly. It is also clear that in this age of promoting sustainable transport, walking should be encouraged, together with other eco-friendly and healthy means of transport such as cycling. To do so requires a systems approach.

I am glad this conference is taking place, with its aims to explore safety and system aspects of pedestrian activity and I hope the meeting will advance the subject. I congratulate the conference organizers and among them Or Yarok, the Ran Naor Road Safety Foundation, Transportation Today and Tomorrow, and the Ministry for the Protection of the Environment for their initiative and wish us all a productive conference.

Avi Naor
Chairman and Founder of Or Yarok and
The Ran Naor Foundation for Road Safety Research

Opening Address

I would like to welcome the participants in this conference on pedestrians. The meeting takes place in the context of an activity by a group of professionals from Europe who are part of a project funded by the European Commission. The title of the project is PQN 358- Pedestrian Quality Needs and we will hear a lot more about this project from the leader of this group who is here with us, Mr. Rob Methorst, from the Dutch Ministry of Transport. Among the aims of the project is to improve our understanding of the interaction between public space, the transportation system and social, legal and political interactions to create a high quality environment for pedestrians.

The project acts on the research plane on the one hand, collecting the best of available knowledge on a large variety of associated issues but, on the other hand searches for ways to implement the knowledge and improve the environment, both in terms of quality of mobility and safety.

As the result of the fact that some 50 European professionals will be arriving in Israel for this project, it was felt that this would provide an excellent opportunity to create an interaction between them and the Israeli professional community. To present before the guests some of the Israeli knowledge and to hear from some of them about their experiences.

In terms of pedestrian safety, Israel does not occupy a good international position and we hope to shed some light on this issue at this conference.

I would like to thank the conference sponsors, among which are the Ministry for the Protection of the Environment, Or Yarok, the Ran Naor Foundation, Transport Today and Tomorrow, and the Green Environment Fund for their support in making this conference possible.

Professor Shalom Hakkert
Scientific Director,
The Ran Naor Foundation

Opening Address

The oldest mode of transportation in the world is walking. Over the last decade, we have become accustomed to driving to the grocery store and to the post office, and our children don't know how to get to school anymore by walking. One tenth of the commutes in private cars within the city are less than 1 km. This becomes a burden on the transportation system.

Contemporary high-tech and society allow us to live without walking anywhere. For that reason, walking will usually take place out of choice. Walking will be chosen when it's preferred over other means of transportation and provides a better experience.

Transport Today and Tomorrow has placed as a goal to act towards creating a pleasant and safe environment for walking, as part of the implementation of the vision of sustainable transportation.

Walking is essential for our health and contributes to the proper physical and cognitive development of children. Walking does not pollute, nor consume parking space and fuel, and it is the complementary mode for public transportation.

Pedestrians are the essence of urbanity. Their presence or absence indicates the quality of urban space.

Many cities in the world perform transformations to improve the experience of walking. Prominent examples are Copenhagen, Barcelona, Vancouver, Melbourne and London.

We are currently developing a project which aims at the joining of municipalities in Israel to the charter of WALK21. These cities will join the most developed cities in the world, which are committed to the promotion of the culture of walking, the creation of urban space dedicated to people instead of cars and other forms of motorized transport.

Finally, I would like to express my gratitude to the Ran-Naor Foundation for the initiative of this conference, as well as to our partners at Or-Yarok and the Ministry of Environmental Protection, without whom the conference wouldn't have taken place. Surely, the success of the conference will lead to the deepening of cooperation.

Improving the position of pedestrians in the city is a common goal for those who deal with road safety, environment and sustainability. For this reason, the partnership, created here in this conference, is important and appropriate to continue.

Tamar Keinan
Executive Director, Transport Today and Tomorrow

The New National Guidelines for Pedestrian Space in The Streets

Arch. Doron Zafrir, Farhi-Zafrir Architects

The transportation system in Israel was based until recent years on private and public motor traffic, with emphasis on aspects of capacity and level of service. That perception has been replaced in recent years by a new concept which emphasizes quality of life and safety by rearranging the public space. The new urban planning reduces the area used for private and public transport, and allocates the area for soft transportation - pedestrians and cycling.

The main issues of the new concept: more safety, less through traffic, less noise and air pollution, less space for private vehicular traffic, more space for gardens, playing, walking, and cycling.

The new approach directs more attention to the pedestrians. The pedestrian is not just a "moving tool" integrated in the city's complex traffic. The pedestrian is the human essence of the city. His spontaneous and human movement is the initial connection between man and environment. Therefore, the urban street is not just a traffic route but first of all a space for communal life.

The new guidelines set for street planning in Israel use some new definitions for practicing the new concept of the public space. Here are some of them:

Urban Street - an urban space which is used for all municipal activities (residential, commercial, etc). The most important movement component in the street is accessibility.

City Road - an urban space which is used mainly to connect different parts of the city. The most important movement component of the road is mobility.

Portrait of the street - the street planning program regarding all activities planned for all the street users.

Street model - a principle description of the street's configuration regarding the needs and requirements listed in the "street's portrait".

Walking strip – a part of the sidewalk which is used for pedestrian movement along the street.

Furnishing Strip - a part of the sidewalk which is used to accommodate the street's facilities, landscaping, and infrastructure.

Facade strip - a part of the sidewalk along the facade of buildings and front yards, which is used to expand the pedestrians' space for public use, and to prevent adjacent components like vegetation, signs, etc penetrating the walking strip.

Space Activity - a local expansion of space for pedestrians, in order to allow more room for special activities for pedestrians.

Street Corner - the intersection of streets, intended for movement and activity.

Pedestrian trail – a pedestrians strip which is not located in the street, that connects streets in inter-urban areas.

The street's Concept is based on a balanced distribution of the street's space. Therefore, all the factors involved in the planning of public space will take part in the street's planning, including town planners, traffic and road planners, architects and landscapers, infrastructure planners, etc. In addition to the above, the book is aimed at the policy and decision-making public, representatives of interested parties in the public space, and even the general public.

Pedestrians' Rights in Urban Centers

Research Team - Tel Aviv Institute for Study and Research of Architecture; Environment, Culture and Community

Head Researcher - Prof. Moshe Margalith, TAU, Tel Aviv Institute for Study and Research of Architecture; Environment, Culture and Community
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The use of public domains in urban centers reflects the delicate balance and intensity of use by the different users, pedestrian passersby and residents, local and regional vehicular traffic.
Pedestrian accidents in urban centers present an urgent need to define models for shared public domains in urban centers.

Local and regional roads in Israel have been transformed into main urban commercial streets, shared by pedestrians and local and regional vehicular traffic. The changes in the local and regional road systems, and those planned for the near future, will affect the nature and functioning of urban centers across the country, calling for an urgent discussion on the character of urban domains shared by pedestrians and motor vehicles.

The aim of this study is to examine different models to accommodate the needs of motorized traffic and to improve the quality of pedestrian domains in urban centers, **two mandatory prerequisites for the sustainability of urbanism.**

The uniqueness of the study is expressed in the correlation between the vulnerability of pedestrians to accidents in different models of the division of the space between pedestrians and vehicles, taking into account the physical characteristics of the streets and roads, land use, types of activity, and the pedestrians' attitudes towards and appreciation of these domains.

The methodology of the study is based on a division into three parts. The first, a study of public domains in urban areas, review of professional literature and evaluation of precedents in Israel and abroad.

The second part, examination of case studies in Israel conducted through documentation and surveys focusing on the relationship between the socio-

economic profile of users and the characteristics of the physical environments examined.

The third is conclusions and recommendations for the planning of shared urban domains.

The case studies included some 520 interviews with adults 17 years old and up, observations conducted to monitor the relationships between peoples' activities and places. They present three multi-use main roads: Sokolov St. in Ramat Hasharon, Ahuza St. in Ra'anana, and Weizmann St. in Kfar Saba, typifying many of Israel's medium-size cities.
The three are the cities' main commercial streets, but they differ in the nature of their local and regional traffic, and in the physical characteristics of streets and adjacent buildings.

The primary study findings showed that in general people did not come to the street for a planned activity but rather for passing, hence to see and be seen. The study revealed a low level of pedestrian accidents in spite of the intensive vehicular and pedestrian activities. The three streets are all well integrated into their respective surroundings, with a dense network of side streets, pedestrian walkways, and road crossings which all make streets largely accessible.

Wide sidewalks, colonnades, and street furniture create a pleasant urban pedestrian domain that encourages prolonged use for both planned activities and occasional socialization; thus **these streets are the cities' living rooms, where users testified to feeling comfortable and safe.**

The study revealed that, regardless of gender and age, all segments of the population have, in spite of vehicular traffic, favored continuous use of streets and have considered them **the blood vessels of urbanity.**

For the implementation of the study findings- as planners and authorities seek solutions for movement systems in urban centers, at times infringing on pedestrian rights, and even abolishing them, the futures of many urban centers in Israel are affected. The contribution of this academic study is expressed in its guiding us to the formation of renewed definitions and the improvement of existing physical models in urban centers in Israel and abroad and its planning of integrated traffic systems for pedestrians and motor vehicles, **according to the needs and wishes of the city's residents**.

What Does a Good Urban Street Mean?

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While the experience of walking has deteriorated dramatically over the past decades we are recently witnessing a substantial shift towards a more positive perception of walking and new approaches in designing streets and public spaces.

For many years pedestrians were seen mostly as nuisances and obstacles for cars. Their needs were neglected and assumptions were made about their behaviour. This resulted in unsafe and unattractive conditions for them. Creating a good urban street, therefore, requires the knowledge of the needs, abilities and wishes of pedestrians as well as a careful analysis of the characteristics of walking and sojourning. This knowledge and understanding, in turn, has to inform governmental policies, technical guidelines as well as communication and evaluation efforts. The first part of the presentation focuses on some of the characteristics of walking and what they mean for the implementation of successful measures. In technical terms, this part deals with the system properties of pedestrian traffic as a pre-requisite for creating good urban streets.

In the second part the development in policies in the past decades and the approaches regarding their implementation are analysed – starting from safety orientated single interventions, evolving to a more comprehensive network approach and leading up to the current understanding of a street in its functions as 'link' and 'place'. Based on Jan Gehl's cryptic comment that there is much more to walking than just walking, some of today's main requirements and ingredients for a good urban street are discussed. Liveability, design quality, economic vitality, environmental sustainability and social inclusion are among the keywords in the current planning approaches from New York to Paris and from London to Melbourne. This part sketches out the paradigm changes and trends and discusses some of the moving forces behind them.

The role of planners, architects and engineers is crucial for a successful implementation of walking provisions and the creation of attractive public spaces. In order to fulfil their tasks these experts have to translate the needs of pedestrians (and other road users) as well as the demands of technical guidelines plus public and private contractors into specific environments creating safe and enjoyable conditions. This "art of translation" and interpretation will be briefly touched upon since it is an important element and often the cause of unintended negative side-effects.

Assessments and evaluations give us valuable information about successes and failures of urban streets and spaces. In the final part of the presentation, some thoughts on indicators and methods for the assessment of public spaces are given, based on the current project within the Pedestrian Quality Needs project and WALK21 to establish international standards for the collection, analysis and dissemination of qualitative and quantitative techniques for measuring walking. The project and some examples of indicators are presented. More information on this topic can be found on the website www.measuring-walking.org.

Walking in the Urban Region – Will the Pedestrian City Survive?

Prof. Kimmo Lapintie, Department of Architecture, Aalto University School of Science and Technology, Finland

Walking is the historically dominant mode of mobility in cities: the dimensions and density of classical and medieval cities, as well as their relationship to their surroundings, was determined by their walkability. The growth of cities, as well as the introduction of motorized forms of transportation and changing working patterns during the last two hundred years changed all this, and we have seen the decline of walking into a peripheral position in urban and regional mobility.

The suburban development during the last hundred years has resulted in a socially and physically fragmented urban region. Because of increasing mobility, it functions as a unified property-, housing-, and employment market, thus creating pockets of extreme wealth and poverty, as well as areas for the middle classes and suburban life-style.

Within this picture, the historical urban centre is the clear winner. It is rather limited in its dimensions, representing the original pedestrian city. Thus it is economically viable for cities to invest in pedestrian streets and areas and high quality street furniture and services, such as public wells, fountains and toilets. Because the customer base is sufficient, these areas also attract private services that are important for pedestrians, such as cafeterias, kiosks and shops.

The situation is totally different with the suburban parts of the city. The preferred location for the majority of the middle classes and also the employed part of the working classes are the low density suburban districts of detached houses, some of them preferring even exurban locations in the countryside. These are mainly bedroom communities from which people commute daily to the city centre and to the other centres of employment in the regions. High car-ownership and low density together makes it very difficult for the

city authorities to provide for local public services or public transport. Thus there is very little to walk to, and walking is usually practiced for recreational reasons.

Functionally, the 'smart growth' of the urban region seems more promising, since high density concentrations along public transit lines makes it possible to guarantee accessibility for both the middle classes and the poor, and also public and private services can be provided locally in the sub-centres of the city. However, if the density is very high and the overall environmental quality low, these suburban developments can easily become socially segregated from the rest of the urban fabric.

'Psychological aspects of children and elderly pedestrians vulnerability

Limor Hendel, The Ran Naor Road Safety Research Center, Technion

Children and the elderly represent two of the most vulnerable groups among pedestrians. The rates of injury to children in pedestrian accidents are higher than in the adult population. In pedestrian accidents, most of the risk factors of adults are also valid for children, while the risk of injury is affected by the speed of the hitting vehicle and by other factors related to vehicle safety and road environment. There are, however, additional risk factors unique to children that stem from their physical, cognitive, and behavioral characteristics. On the other side of the scale, the elderly (65 or over) represent the highest risk age group among Israeli pedestrians. The reasons for that also lie in their physical, cognitive, and behavioral characteristics. While for children, the characteristics and abilities are at initial stages of development, for elderly people, they are declining.

In 2008, 668 Israeli children (aged below 14) were injured as pedestrians, representing 22% of the total number of children injured in road accidents. The percentage of children pedestrians killed or seriously injured was 64%. Most children pedestrians who were injured severely burst into the road, crossing far from a crosswalk or intersection.

In 2008, 757 Israeli elderly people (aged 65+) were injured as pedestrians, representing 35% of the total number of elderly people injured in road accidents. While elderly people account for 10% of the Israeli population, the share of this age group among pedestrian fatalities is significantly higher - 42%. Over the period of 2004-2008, the majority of elderly people severely injured in road accidents (63%) were pedestrians. Elderly pedestrians are injured mainly outside pedestrian crossings and not near intersections.

In the European Union (EU), elderly people (65 years old and higher) represent the biggest group among pedestrian fatalities (46%). Compared to the EU average, the share of this age group is slightly lower in Israel - 42%. On the

other hand, the share of children (aged 0-15) killed as pedestrians is 2.7 times higher in Israel compared to the EU average: 19% versus 7%, respectively. Considering the population composition in Israel, however, the chance of being killed as a pedestrian is significantly higher (6 times more) for an elderly person than for a child.

In order to treat the pedestrian road safety problem there is a need to analyze the pedestrian's task, breaking it down into the component skills and strategies required to deal with various problems encountered in traffic. Thomson et al. (1996) described the most critical psychological skills involved in road user behavior:

- Detecting the presence of traffic: the detection of traffic involves a range of basic processes including selective attention, visual search, resistance to distraction, coordination of visual and auditory information, and the perception of crossing locations as safe or dangerous.
- Visual timing judgments: determining the vehicle's direction and rate of movement so that accurate time to contact judgments can be made.
- Coordinating information from different directions: processing information about vehicles approaching from different directions. This requires an ability to divide attention, to hold information in memory, and to coordinate and integrate this information.
- Coordinating perception and action: the ability to relate the time available for crossing to the time required to cross in order to determine a realistic safety gap for crossing. The time required to cross will vary according to characteristics of the individual's own movement as well as to external factors such as the road width.
- Another stage entitled recognizing safe or dangerous locations was added before the visual timing stage.

Children's limitations on the road:

There is a need to recognize the physiological and psychological limitations characterizing young children that make it difficult for them to deal with and integrate in the road environment.

- Cognitive-developmental characteristics: magical thinking, right and left distinction, speed assessment and distance perception, memory, attention, causation.
- Physiological-physical characteristics: distance estimation, vision and visibility, hearing.
- Emotional characteristics: impulsiveness versus restraint, sense of risk.

Findings from research studies around the world show that child pedestrian injury is characterized by several aspects such as: presence of visual field obstruction, prevalence of injury in children younger than five years old, where injury usually occurs to unaccompanied children, and mainly in residential areas.

The elderly person's limitations on the road:

As age rises, there is a decline in the abilities of the visual, cognitive, perceptual and motor systems.

- Cognitive characteristics: a decline in cognitive abilities such as speed assessment and distance perception, response time, attention, concentration, decision-making and road crossing planning.
- Physiological-physical characteristics: poor health, use of medication, visual and hearing impairments, a decline in walking quality, slower walking speed, and physical vulnerability.
- Behavioral characteristics: a denial of physical and cognitive decline, lack of sense of risk and a tendency to feel a high sense of security while crossing, a reaction to casual situational stimuli without relying on existing knowledge.

Elderly pedestrian injury has several main characteristics such as: elderly pedestrian accidents tend to occur during daylight hours; often close to home or to shopping centers and recreational venues; elderly pedestrians are more involved in accidents in complex traffic situations, such as: at intersections,

particularly those without traffic signals, with turning or reversing vehicles, where they cross at mid-block sections of roads, on wide multi-lane roads, in busy bi-directional traffic, as well as while boarding or alighting from public transport.

Measures to improve children and elderly pedestrians' safety: improving road safety for children and elderly pedestrians requires adopting a holistic approach which combines infrastructure measures with forgiving design of vehicles and measures addressing the behavior of all road users (including education, training, publicity and enforcement). This approach moves away from the idea that children should adapt their behavior to cope with the traffic, in favor of an approach that recognizes that children's needs should be addressed in the design and management of the whole road system. Improving the road safety of elderly people requires a combination of actions in the fields of infrastructure, community, training and publicity, as well as traffic law and police enforcement (especially concerning drivers).

Quality Needs – COST project 358 'Pedestrians

Rob Methorst

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The Pedestrians' Quality Needs Project (PQN) has been established to identify what people need for their safe and agreeable mobility in public space and to show the added value of a systems approach compared with sectoral approaches. The main objective is to provide knowledge of pedestrians' quality needs and how these needs relate to structural and functional interventions, policy making and regulation to support walking conditions across the EU and other involved countries.

Critical preconditions are awareness, willingness to act, opportunities, competences and skills of policy implementation agents and – of course – implementation of policy plans.

A system approach integrates knowledge regarding aspects of walking and sojourning in public space, as well as relevant interrelations, processes and contexts. It offers a holistic view on walking and sojourning and on conditions that determine walking and sojourning in public space. A system approach is quality oriented; in principle it does not start from identified problems, but from the needs of pedestrian. It aims at improving the system, making it support walking and sojourning optimally.

Within the PQN project knowledge on the system, its deficits and options for improvements were studied in 4 working groups, dealing with functional needs, with perception, with durability and future prospects and with coherence and integration.

Overview is 'constructed' via modelling of the pedestrian system and the change processes needed for improvement. The needs of pedestrians were identified and substantiated. Data and information on walking and sojourning were gathered. Design principles and requirements regarding the

physical environment, the social, political and normative environment, and transportation, were figured out. Gaps in knowledge are being identified. Currently work is being done to write recommendations for practitioners to improve walking and sojourning conditions. At the Tel Aviv conference some striking findings will be introduced.

The full PQN results will be presented at the WALK21/ICTCT conference 'Getting Communities Back on the Feet' in November 2010, in the Kurhaus Hotel in The Hague.

A Safety Evaluation of Detailed Plans of Urban Streets With Mixed Land Use

Prof. Doron Balasha
Research team : Dr.V. Gitelman, Dr. J. Roth, S. Tolentino, E. Doveh, F. Pesahov, N. Bek

The Ran Naor Foundation for road safety research
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1.General

This study investigates the relationships between detailed town plans (DTP), infrastructure and traffic characteristics and the level of road safety on urban streets with mixed land-use. An urban street with mixed land-use is a street which, in addition to residential use also serves other land-use purposes, mainly such uses as: commerce, business and public buildings, which compose more than 50% of the properties along the street on at least one of its sides.

For analysis purposes, in this study detailed data was collected from 88 street sections in 25 towns. The data base includes the following components:

1. General characteristics of the streets, collected from a preparatory street survey- including type of street, character and general appearance;
2. Engineering characteristics gathered from a detailed survey- cross-section, intersections, engineering details, traffic and pedestrian volumes, travel speeds
3. Accident characteristics on those streets for the period 2002-2006
4. Information gathered from detailed town plans of those streets, including the calculation of an index of mixed land-use (shops, commerce, businesses public buildings, open public space) out of the total street length. Each street section was given a grade and was assigned as mixed land-use if the index exceeded 50%.

2. Street characteristics

The streets examined in this study were of four types: dual carriageway, two ways, single carriageway two ways, single carriageway one way and single

carriageway one way with a bus lane. Examining the data base showed that the majority of streets were with two ways traffic, straight and level, with between 70%- 100% commercial frontage, multi-level buildings of up to 8 floors, with DTP classified as "planned for mixed commercial land-use". Most of the streets had marked pedestrian crossings and bus stops and had considerable volumes of pedestrians and traffic. At the same time, traffic arrangements did not convey a clear message as to the priorities in the streets and traffic calming elements for vulnerable road users were missing.

Over 10% of the accidents registered on the streets were with serious or fatal injury. In over 30% of the accidents a pedestrian was injured and over 50% of the accidents occurred at the intersections.

A comparison of the accident characteristics on the study streets with those characteristics in 20 towns in Israel showed that the number of accidents per 100 meter street length and the number of serious accidents and the number of pedestrian accidents per 100 meters were all significantly higher in the study streets than in the general street population of the towns.

This indicates the level of road safety on those streets with mixed land-use is lower than that of the other streets. And that on such streets there is a higher risk of accidents, including serious ones and accidents with pedestrians.

3. Explanatory model

In this study an explanatory model was developed linking street characteristics with the number of accidents on the streets. According to the model, variables which increase the number of accidents on mixed land-use streets include: percentage of commercial frontage (values higher than 50%); increased variance in the speed distribution; an increase in the number of pedestrian crossings per road section; increases in traffic volumes and also whether the street was designed as mixed land-use or with open public space. On the other hand, characteristics associated with a decrease in the number of accidents were grades and curves along the street, an increase in cross-section width(including parking, excluding sidewalks) and when the street received a grade as originally designed for mixed land-use, at least on one side of the street.

From this, statistically significant relationships were developed between engineering arrangements on the streets, type of street, traffic and pedestrian volumes and the number of accidents. It was also found that the initial design of the street as mixed land-use affected the accident frequency.

In addition, a model was developed linking street characteristics with pedestrian accidents. Explanatory variables included the cross-section, type of intersections traffic volume, percentage of public transport, type of street, existence of pedestrian railings, travel speeds and initial design characteristics for land-use other than for residence.

According to the model, designing the street initially for mixed land-use increases the accident risk for pedestrians. Streets with high actual levels of traffic and pedestrians are associated with an increase in accidents, while the existence of arrangements meant to increase pedestrian safety, such as wide sidewalks, pedestrian railings were not found to increase pedestrian risk consistently.

4. Recommendations

To ensure appropriate levels of road safety on streets with mixed land-use efforts should be put in providing appropriate engineering arrangements. A number of recommendations follow from the study, which include:

- The level of safety of a street should already be considered at the DTP-detailed town plan phase, including a safety audit.
- To minimize the potential conflicts between traffic and pedestrians streets with mixed land-use should be prevented from turning into high volume traffic arterials.
  Streets with mixed land-use should have one traffic lane per direction. On two way streets, a physical separation should be provided between the directions, partly with a low raised median. One way streets can be provided.
- On streets with mixed land-use adequate on-street parking should always be provided.

- Detailed intersection design should be carried out at the DTP stage, but with a large degree of flexibility. Attention should be paid to the possibility of providing roundabouts, increasing sight distance at intersection approaches by restricting private property dimensions and increasing right-of-way.
- All streets should have traffic calming elements. Design should provide for wide enough sidewalks and appropriate pedestrian crossings.
- Where existing streets change their function and turn into streets with mixed land-use, such change should be accompanied by requirements for appropriate traffic arrangements (through the process of issuing permits for commercial use).

Obstacles to the Implementation of Traffic Calming in Israeli Towns and the Policies Needed to Overcome Them

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Ilan Klieger, Valdimir Pirojenko
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In 2002 the Ministry of Transportation (MOT) published the Guidelines for Traffic Calming Areas. Since then only a handful of projects have been planned and implemented. This study, funded by the Ran Naor Foundation, seeks to understand the barriers to implementation of traffic calming and to suggest policies to overcome these obstacles.

In the first phase of the study we surveyed the state of the implementation of traffic calming in Israel, distinguishing between traffic calming measures and the implementation of traffic calming areas as defined by the guidelines. Our research methods included:

1. In-depth interviews with all the primary players responsible for such projects: district transportation officers, local transportation officers, city engineers, transportation and traffic consultants etc. In these interviews we inquired about their level of activity in traffic calming and their views about the guidelines.

2. Interviews with public bodies promoting development plans: Ministry of Construction and Housing (the only body to adopt TC as policy in new neighborhood planning), Land Administration Authority, Municipalities, District Planning Commissions.

3. Collection and analysis of meeting protocols and information from local transportation commissions and MOT reports on local projects approved for funding.

Our findings show that there is indeed very little implementation of traffic calming according to the published guidelines, either in new or established

neighborhoods, despite the high awareness of local safety problems, and increased activity to resolve them. This activity continues to be local in scale and along familiar lines of separation of movement and reduction of conflicts.

The way in which the MOT disburses funds does not encourage holistic projects, but breaks them down into small local interventions. The MOT, after publishing the guidelines, did nothing in particular to promote them by creating a special funding pool. Neither was any attempt made to combine TC with other urban renewal programs.

The case studies show us that the particular structure of Israeli cities, where the functional hierarchy is dominant, requires adaptation to the guidelines, as most pedestrian accidents occur on the arterial roads which would not usually be calmed under the current guidelines. A simplification and extension of the guidelines should be considered.