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District-scale Traffic Planning and Management

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1. District-scale Traffic Planning and Management in Japan

Editor: Fumihiko NAKAMURA, Yokohama National University

District-scale traffic planning and management deals with the planning and the management of road traffic on a micro scale. It deals with micro-scale and short- term issues, and is in contrast with studies concernconcerned with forecastingtransportation demand

One of the reasons this field is active in Japan is that past attempts in Europe and the US were introduced systematically, and trial cases are being implemented based on overseas precedents. This article provides a specific explanation of these precedents with a focus on measures regarding pedestrians.

Firstly, the oversea precedents can be listed as in Table 1.

Table 1: Overseas Events that have Influenced District-scale Traffic Planning and Management in Japan

year	event	issues
1928	Radburn Development	Segregation of pedestrian and vehicular circulation
1929	Neighborhood theory	Neighborhood design concept to protect residents from through traffic
1963	Buchanan Report	Definition of Environmental Area as one with no through traffic and a hierarchy of roads in terms of balance between traffic function and access function
1970	Woonerf demonstration	Concept of space as shared between pedestrians and vehicles. Introduction of chicanes and humps
1970	Appleyard's "Livable Street"	Importance of citizen involvement in the field of district-scale traffic planning and management
1980's	Traffic Calming	Package of devices to reduce traffic speed within designated zones called zone 30 or zone 20 using various types of devices such as chicanes and humps.

In practice, consideration for pedestrian safety and amenity started in the 1960s. The earlier attempts were in large-scale new developments where road networks played a central role. As representative examples we can think of the introduction of the Neighborhood District concept in Senri New Town and automobile-pedestrian segregation in Tama New Town.

In the 1970s, cases that tried to deal with traffic issues by changing the nature of traffic regulation in existing built environments began to appear. The Residential Environment Improvement Program which started in 1975 was the first attempt to integrate road improvement and traffic regulation. In the case of Amagasaki, curbstones were placed diagonally at intersections to block the automobile flow.

In 1980, two years after the Woonerf concept was introduced from Holland in 1978, "a community road" was completed in Osaka City, and this may be seen as a prototype of the Japanese version of Woonerf. In this milestone attempt, the existing structure of the road was changed; the driveway was narrowed and chicanes were placed on the road. This was the result of cooperation between road administrators and traffic administrators. The Community Road became a national program and developed into the Roadpia Program.

In the late 1990s, under the influence of the traffic-calming program in Europe, a program called "the Community Zone" began. It integrated traffic regulation and road improvement, with residents' involvement as its main principle. After humps were legally approved by an amendment to the Road Construction Ordinance, the community zone program went national and was implemented in dozens of districts.

As described so far, the district-scale traffic planning and management has developed in theory and in practice through learning from the West and through an accumulation of micro-scale, short-term measures. Apart from the pedestrian measures described here, there are many other aspects that need to be considered, such as bicycles, people with disabilities, transit malls linked to public transportation, relationship to downtown revitalization, and relationship to tourist attractions. A number of real life examples (many of which may be in the form of social experiments) can be found.

2. The Introduction and Development of Community Zones

Hisashi KUBOTA, Saitama University

The Community Zone is a district traffic safety program implemented since 1996 in Japan. The program is modeled on Europe's ZONE 30, and it focuses on an area encircled by arterial roads.

The program was introduced with the aim of integrating the measures practiced by the Public Safety Commissions (Residential Zone regulations) and those practiced by road administrators (Community roads). By linking them, the Community Zone tries to achieve effective traffic safety within a district.

The Community Zone program has characteristics that are distinctive from conventional traffic safety measures.

1. It captures the target area in an integrated manner

An area encircled by arterial roads is captured in an integrated manner in that through traffic is eliminated from the target area while a comprehensive package of traffic safety measures is implemented.

2. It coordinates regulations and physical devices effectively

The software, such as traffic regulations, and the hardware, or physical devices, such as humps and chokers, are effectively coordinated in the community zones. This means that traffic safety is achieved through cooperation between the traffic administrators (the Public Safety Commissions) and the road administrators.

3. It has a comprehensive implementation structure including residents and related organi zations

Upon implementation of a community zone in a neighborhood, a participatory process is specified, e.g., the formation of a residents' committee. Cooperation between local organizations such as residents' associations, local merchants' associations, and local schools, and public agencies such as park authorities and fire departments, is also needed.

4. It includes comprehensive consideration (e.g., accessibility, environment, and machizukuri) of both road users and residents

Although the primary goal of the Community Zone program is traffic safety, utilization of the physical devices can contribute to improving accessibility and the environment of the target district. It has the potential to develop into community development in a broader sense.

As of fy2001, the Community Zone has been adopted in 152 districts, in 58 of which the construction is nearly complete. In a before-after survey, significant effects, such as traffic accidents reduced by half, were observed in most of the researched districts.

In 2003, a new traffic safety program, "Secure Walking Area," was introduced. The new program does not limit its target to "an area encircled by arterial roads." Spot measures like pedestrian-automobile separating intersections and linear measures like the widening of roadside spaces can be implemented where appropriate, and it seems as though traffic safety measures have entered an era of diversification. Besides residential areas, application of such zone programs to commercial districts is now being considered, and the linkage between traffic safety and machizukuri is becoming clearer and clearer.

3. A Review of the Impact of Community Zones

Naruhito HASHIMOTO, Toyota Transportation Research Institute

The Community Zone, which was introduced in 1996, was the first full-scale district traffic-calming program in Japan. Up to then, traffic safety measures in residential areas centered on traffic regulations such as school zones and silver zones, or linear or on-the-spot modification of hardware such as Community Roads and intersection improvements. As the first attempt to combine traffic regulation and device modification, taking into account the extent of surface coverage of residential areas, expectations of the results of the Community Zones are high.

Besides traffic safety, expectations of the kinds of impact likely to be produced by Community Zones include the creation of safe and comfortable pedestrian space, the mitigation of traffic pollution, community revitalization, and crime prevention. Thus, when reviewing the impact of Community Zones, many aspects such as those listed above have to be considered. However, due to space limitation, this article will focus on the decrease of traffic accidents, which is the central theme of the program.

Figure 1 shows the increase and decrease of accidents which occurred in 19 community zones which had been implemented for more than a year as of March 2002. The number shows only a national trend but the accident-reducing effect of the community zones can be clearly observed.

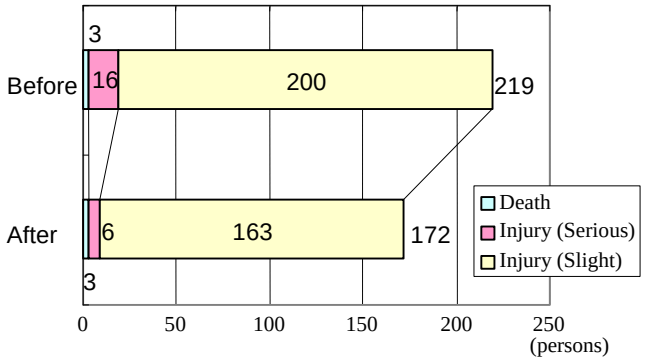


Figure 1. In Crease and Decrease of Accidents

(Occurred in 19 Community Zones)

In terms of the speed of automobiles, a before-after assessment has been conducted in 12 districts (25 survey points). There is room for discussion on how the speed-controlling effect within the rearranged surface areas can be assessed. However, by simply looking at the 25 points, the average speed has decreased by 15.7%, from 37.8 km/h to 31.9 km/h. Here also, the impact of the community zones is clear.

Furthermore, residents' evaluation is important in a program such as this one, which is closely related to everyday life. In residents' surveys that are conducted in many places, a majority are in favor of the program. The result shows that community zones are valued not only for their traffic safety effect, but also as a measure for improving the living environment.

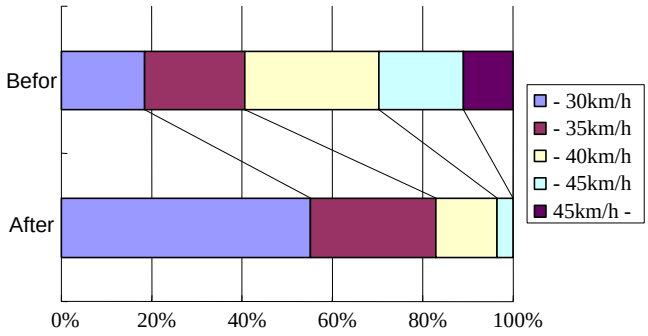


Figure 2. Average Speed of Survey Points

As discussed above, past surveys show that the Community Zone generates positive impacts. However, some issues still remain as subjects of future study.

A typical example would be the lack of safety-securing measures in narrow streets without sidewalks, which account for the major part of the streets of Japan. The impact of a community zone in Mitaka, Tokyo, shown in Table 1, describes the problem clearly. The Mitaka Community Zone, as a model district, was one of the first community zones to be completed. Table 1 shows that the number of accidents was reduced by half in total, but no effect was observed in the number of accidents happening in narrower streets, showing that the safety measures in such streets require further study.

These streets, with a width of less than 6 meters, are very prevalent in residential areas, and study of traffic safety measures for such streets is being conducted as an urgent issue.

Table 1. Accident Occurrence of Road Classification

(The Mitaka Community Road)

Classification	Before			After		
	1994	1995	Ave.	1997	1998	Ave.
Trunk Road	7	12	9.5	10	9	9.5
Non-Trunk Road	14	29	21.5	4	5	4.5
Total Accidents	21	41	31.0	14	14	14.0

To conclude, the Community Zone is significant as Japan's first full-scale district traffic-calming program. The various kinds of impact on traffic safety and environmental improvement are becoming clear; the issues are also becoming clear. Therefore, the promotion of further study and more implementation in residential environments are now expected.

4. The Street Regeneration Project in the Kurosaki District, Yahatanishi-ku, City of Kitakyushu

Hiroshi IMANAGA, City of Kitakyushu Construction Bureau Road Department,
Road Planning Section Chief

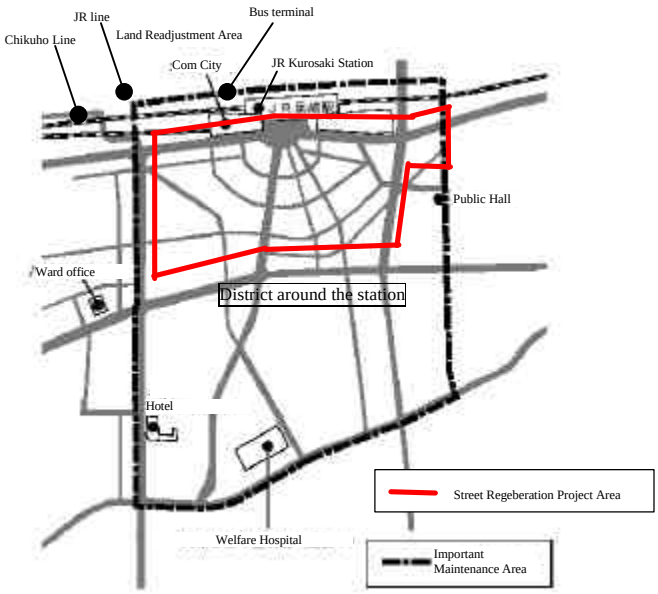
Kurosaki District is a designated subcenter in "the Kitakyushu Renaissance," and as an important transportation hub, the district developed around JR Kurosaki Station. However, with the increase of suburban megastores and the exodus of residents to the suburbs, along with changes in the economic situation, the district is now losing its power to attract people.

Responding to this situation, the City of Kitakyushu has promoted several projects and community development initiatives through public and private partnerships. In July 2002, with the cooperation of local people and business enterprises, the City drafted a "Kurosaki Subcenter Barrier-Free Plan," envsaging the formation of a city where every person can live safely and comfortably, and this is now being actively promoted.

On the other hand, traffic problems in the commercial district around the station were serious. Due to the congestion caused by cars, pedestrians and bicycles, traffic accidents occurred frequently, and illegally-parked cars and bicycles inhibited the proper functions of roads. Thus, in order to create safe streets and revitalize the district, the "Street Regeneration Project" was initiated.

In 31 streets comprising the commercial district, workshops were organized on the basis of active local cooperation. At present, the workshops are ongoing in five of the streets. The discussions cover wide range of issues including sidewalk improvements, measures to deal with illegally parked cars and waiting taxis, rules for using loading/unloading spaces, and future maintenance of the streets. After an improvement plan is drawn up, an implementation project is launched. This year, an implementation project has been launched in one of the streets.

In order to promote the "Street Regeneration Project," locally-led workshops were adopted rather than the conventional government-led process commonly used in road construction work. It is expected that the process will raise the awareness of local people concerning machizukuri and eventually lead to the revitalization of the downtown shopping streets.



pic. 1 Kurosaki District

In order to maintain the improved streets after the project finishes, it is also important to raise the awareness of the residents and shopkeepers who live and work in houses and shops fronting onto these streets and to ensure that agreed management rules are complied with continuously in the future

5. Efforts by the Ministry of Land, Infrastructure and Transport to achieve a Bicycle-Friendly Environment

Masanori WAKAO, The Ministry of Land, Infrastructure and Transport, Road Bureau

1. Characteristics of Bicycles

Bicycles are environmentally-friendly vehicles without emission, and easy to ride requiring no license.

In the 2000 National Census, bicycles maintained a stable 10% as one of the representative modes for commuting, and even today, when the automobile share has swollen, bicycles still play an essential part(Figure 1).

2. Bicycles and the Battle against Global Warming

In the Kyoto Protocol, Japan committed itself to a 6% reduction in greenhouse gas. In order to accomplish this target, many measures related to transportation are being considered. The promotion of bicycle use and the consequent reduction of automobile use is one of them.

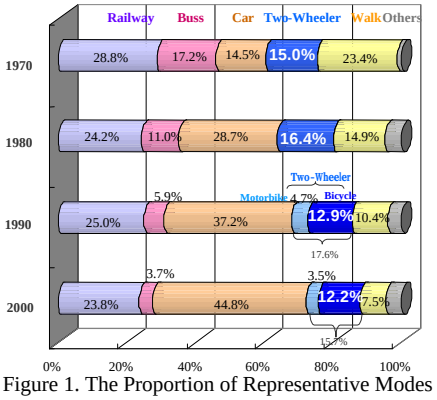


Figure 1. The Proportion of Representative Modes Used for Commuting

Table1. The Extension of Bicycle tracks in Key Countries

country	year	Extension of bicycle tracks (km)	percentage(%)	length per amount of land (m/km2)	length per 1000 bicycles (km)
Netherlands	1985	14,500	8.6	349	1,317
Germany	1985	23,100	4.7	65	660
Japan	2001	5,945	0.5	16	70

3. Issues surrounding Bicycles

(1) Large Number of Accidents involving Bicycles

Twelve percent of the total number of fatal accidents happen while people are riding bicycles, and this is a high rate compared to other countries. Efforts to reduce the number of accidents are needed (Figure 2).

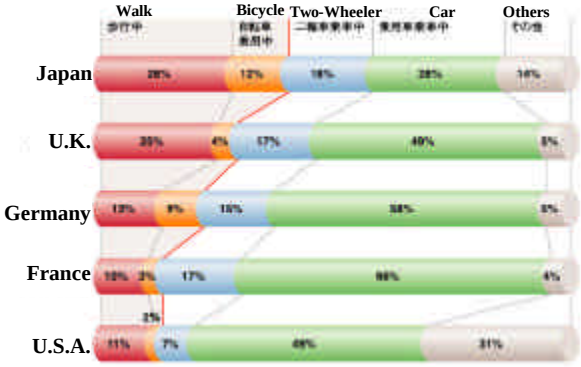


Figure 2. International Comparison of 30-day death count

(2) Scarcity of Space for Bicycles

The extent of roads with specified space secured for bicycles, such as a bicycle track, is 0.6% of the total, and internationally compared, the percentage is much lower than 8.6% in the Netherlands, and also lower than most countries in Europe (Table 1).

(3) Illegally-Parked Bicycles

The number of illegally parked bicycles has decreased from the peak in 1981, when 990,000 bicycles were left illegally, to 540,000 in 2001. However, parked bicycles are still a big issue in front of stations, where they block pedestrian access. Measures are needed (Figure 3).

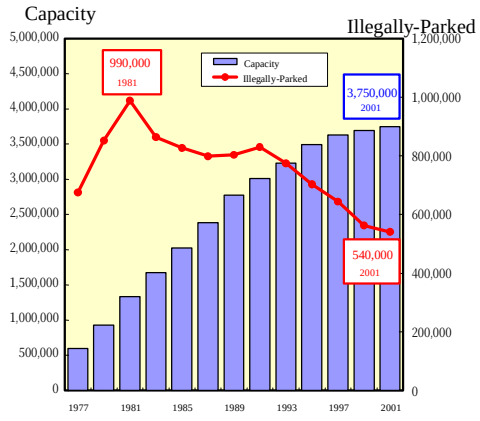


Figure 3. Changes over time in terms of Illegally Parked Bicycles

4. Efforts of the Ministry of Land and Transport

(1) Construction of Bicycle Tracks

Construction of bicycles tracks, bicycle-exclusive tracks, and bicycle-pedestrian paths started in the mid-1960s when automobile accidents showed a rapid increase. The construction such tracks will be promoted continuously in the future (Figure 4).

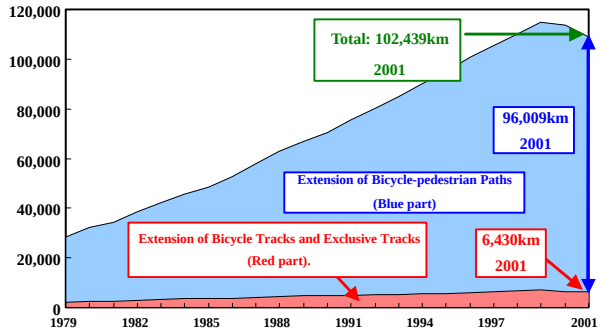


Figure 4. Changes over time in the Extension of Bicycle Tracks

(2) Measures against Illegally Parked Bicycles

To deal with the illegally parked bicycles in front of stations, the construction of parking spaces for bicycles parking is being promoted. In 2001, space for 3.75 million bicycles was secured and is contributing to the reduction of illegal parking.

(3) Designation of Model Cities for a Bicycle-Friendly Environment

To promote the improvement of environment for bicycle use, 19 model cities have been designated as leading cities in the improvement of bicycle-oriented environment in 1999. Extensive support has been given to these model cities (Figure 5).

(4) Modification of the Road Structure Ordinance

In 2001, the Road Structure Ordinance, which sets the basic standard of road structure, was modified so to oblige installation of bicycle tracks on trunk roads where bicycle traffic is significant.

(5) Implementation of Social Experiments

Social experiments are being conducted in many places. In some, bicycles are used as a part of TDM (Traffic Demand Management: the measurement to smooth traffic flow through controlling the total amount.), and in others, Rent-a-Cycle schemes are adopted to reduce illegally parked bicycles (Picture 1).

Picture 1. Social Experiment using Rent-a-Cycle (Niizu, Niigata)

(6) For the Further Promotion of Bicycle Use

Based on the leading examples, the demand from local authorities, and the public, the MILT will continue to promote bicycle use throughout the nation through providing technical and financial support.

6. District Transportation Plan and Barrier-Free/Universal Design

Atsushi MATSUBARA, Oriental Consultants Co. Ltd.

When I drove into an alley in my neighborhood recently, I saw an electric wheelchair winding its way around electric poles and bicycles parked on sidewalks, while the car in front of me passed the wheelchair at a high speed. As I slowed down, the driver of a car behind blew the horn impatiently. Such scenes are taking place everywhere in Japan today.

In 2000, the Barrier-Free Transportation Law went into effect. Simply stated, the law imposes an obligation of accessibility on public transportation services and routes between stations with 5,000 or more users a day and nearby public facilities. According to the road structure guidelines, sidewalks have to be more than 2 meters in width and the difference in levels and the slope of ramps have to conform to a requisite minimum.

By constructing sidewalks, traffic safety for pedestrians will be improved, securing at least one route that is exclusive to pedestrians, including people with disabilities and the elderly. However, there is a concern that the sidewalks may become an excuse for putting off efforts to achieve further improvements in accessibility and district transportation plans. The episode narrated at the beginning of this article is rooted in the mismatch between the road hierarchy and the actual traffic flow.

The development of District Transportation Plans in urban areas is making little progress; and safety and amenity for pedestrians and roadside residents are shifted to ne side as long-term issues. For example, in shopping streets and residential areas, the primary strategy should be to minimize through traffic rather than constructing sidewalks. The next step should be to regulate the speed of automobiles. In Japan, discussions on accessibility often center on the structure of the sidewalks, differences in levels and their width, since the importance and validity of sidewalks have high visibility. However, most streets in Japan are too narrow to have separate sidewalks, making clear the limitations of this strategy. To respond to the accessibility issue faced by many communities, the definitive solution is the calming of traffic through a combination of inflow restrictions and speed regulation. However, in Japan, traffic administrators and road administrators are separate entities, making it difficult to implement integrated measures. Also, in some cases, residents are opposed to inflow restrictions. Therefore, such strategies are not commonly practiced.

If one tries to define how traffic measures have developed from "barrier-free" to "universal design," flat floors and gentle ramps can be defined in terms of barrier-free design, since they correspond to the needs of specific people. On the other hand, the calming of traffic through a combination of inflow restriction and traffic regulation can be defined in terms of universal design, since it contributes to the safety and comfort of every user. The formation of pedestrian malls, and the improvement of transportation systems and hubs focusing on the continuum of traveling may also be considered as falling into the category of universal design in the same sense. Taking a different perspective, the Barrier-Free Transportation Law does not, as its name states, go further than the boundaries of barrier-free. In universal design, it is important to include the idea of the continuum of traveling and to contribute to the raise of the number of people with disabilities and the elderly who engage in outdoor activities. This aim requires not only the improvement of the usability of transportation hubs and measures for pedestrians, but also measures for bicycles, buses, paratransits, Special Transport Services (STS), the linkage between individual services like taxes and mass transit, and the road structures that correspond to these transportations.

Furthermore, to achieve the calming of the traffic, it is important that there is a process of cooperation between residents and the local government. In Japan, the public participation process is not yet firmly established, and also the validity of traffic calming is not sufficiently understood. Opinions such as "I agree with the idea, but I don't want to detour my car or to have devices set out in front of my house" are strongly voiced, and it is common for the discussions to fade away gradually as the topics become specific. Especially in shopping streets, the idea of eliminating cars and creating pedestrian malls in order to revitalize and make the area accessible often fails to win the understanding of the citizens. Many places in Japan are now suffering from labor pains.