

--- Plan for Internal Circulation ---

Road plans, land use plans, and facility arrangement plans are determined on an assumption that daily access to the new town railway stations for commuting to work to attend school or to go for shopping is usually to be made either on foot or by bicycle. Networks of pedestrian's paths are usually provided independently from networks of roads for auto traffic.

Bicycle is an efficient means of transportation for a short distance. Bicycles are used extensively for reaching the railway stations in new towns or in new communities. Further for the past few years, motor cycles have been used increasingly in place of bus services or bicycles.

Bus services also play an important role in internal traffic systems. In a new town, roads running through the neighbourhood centers were built exclusively for use of buses.

--- Plan of High Population Density ---

Since new towns in Japan are built under circumstance of limited land availability, they are built under the prime policy of building a large quantity of houses. As a result, the population density in the project areas are very high, reaching 150 or 200 persons per one hectare.

The automobile ownership rate in Japan is rising fast recently. (The average automobile ownership rate in the country rose from 99 automobiles per every 1,000 household in 1965 to 556 automobiles per every 1,000 household in 1975.) The rise in the automobile ownership rate has so far not affected commuting patterns between new towns and city centers. However, for shopping and leisure purposes, cars are used at an increasingly rising rate. (Percentage of number of passengers transported by private cars for each usage in Tokyo in 1977: commuting, 37.1%; business activities, 13.1%; leisure, 22.9%; others, 26.9%)

The automobile ownership is rising in parallel with the rise in household income level and out of people's desire to seek higher mobility. Unlike commutation, the use of cars for other purposes cannot be avoided by improving public transportation services. The solution should not be attained by constraining automobile ownership but by making efforts not to directly lead the higher car ownership rate to increased autotraffic volume.

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project covers an area of 2,700 hectares. Until today 47 national research and educational institutions have completed their moves to the new city and 22,300 residents are already living there. (Population of the new town is estimated to amount to approx. 120,000) Residential quarters and research institutions are 3 km to 10 km apart. Because road networks are complete, the automobile ownership rate in the city is very high and cars are the main transportation means for commuting. The construction of a new transport rail system is now under planning for the city. It is notable whether the users of cars will shift to this new transport system when it is completed.

4. Direction in Future

Most of the new towns already completed or now developing were either planned or started in the 1960s. In the following ten years, Japan experienced great social and economic changes like other countries. This has created new problems for new town projects.

One of them is that migration from rural to urban areas, which was the most important factor propelling the development of new towns in the 1960s and 1970s, is now gradually but steadily decreasing. Further the housing demand is also shifting from an urgent supply to solve housing shortage in urban areas to steady rising of quality of housing and its environment. The planning conception of new town projects has also changed. Old notion of high density compact city depending on commuting to a mother city was replaced by a new notion of developing more independent town equipped with the function of a local center to serve the surrounding areas. (The city nucleus includes a university or college, large scale cultural, entertainment, and shopping centers, park, athletic ground, etc.)

The main theme in planning new town projects today is not how to plan self-sufficient closed town within the designated area but how to link systematically the new town development to the development of a wider area including the new town.

Further the years of development is also being lengthened. In accordance with these changes, traffic plans for future new towns will not be satisfactory if it only provide mass transportation for handling commuting traffics. It should be so designed to be able to cope with dispersed and decentralized traffic needs. In meeting such requirements, the problem is what kind of public transportation system is to be provide to constrain the use of cars to the most possible extent.

As one of the means of solving this problem we would like to give new consideration to the use of "New Transport System" and encouragement of travel on foot and by bicycle.

--- New Transport System in New Town ---

The technology of this new transport system which is basically a medium capacity truck transport system has been proved to be safe and stable and is about to be practically applied in several new towns.

New towns which are about to introduce new transportation systems are mostly of a scale of 30,000 to 50,000 population. In such cases, the new transport system is considered as a secondary transportation means for linking new towns to the nearest railway station or as internal transportation means for reaching various places within new towns.

New towns were chosen as the suitable sites for developing this new system by the following two reasons; (1) that it is easy to introduce a new transport system in new towns because track line can be freely designed, and (2) that unlike in existing city areas, it is not necessary to make physical or operational adjustments with other existing transportation systems.

Further the size of a new town is usually consistent with the service volume of the new transport system, which are explained by the followings;

- 1) The population of 30,000 to 50,000 is not large enough to justify the construction of a truck railway line or branch line.
- 2) On the other hand, if bus service is adopted as the secondary transportation system for serving new towns with 30,000 to 50,000 population, a large terminal space at the nearest station in existing city areas must be provided and the operational stability is not ensured because of traffic congestion between new towns and the nearest stations.

In new towns of a larger scale such as Tama New Town or Senri New Town which have enough passenger volumes to introduce a railway line, which covers considerably large

area within the new town, a new transport system is obviously less efficient than a rail way.

Although the new transport system has the following short comings as an internal transportation system,

- 1) networks of lanes for the new transport system must be constructed outside the road-car system.
- 2) internal traffic volume itself is so small as to be handled, without the new transport system.

It has the following merits.

- 3) It is superior to bus in conserving environments (noise and air pollution).
- 4) It's operation is more stable than bus in terms of time accuracy.
- 5) The long term operational and maintenance cost is cheaper because of its computerized operation.

Thus if it is adopted as part of the secondary transportation system for linking to the nearest railway station as well, the new transport system can be viable as an internal transportation means.

New transport systems are now on the stage of experimental operation at Kobe Port Island, the south port area of Osaka and other areas. The new transport system has following problems that must be solved in future.

- 1) To improve the reliability of its full automatic operation.
- 2) To reduce operation costs by expanding an operation scale instead of operating in individual areas.
- 3) To standardize the structures of various systems.
- 4) To study the applicability of the system to handle so small traffic volume as to be handled by a demand-bus system while it has been proved to be an efficient system to handle the traffic volume in-between for a bus and for a railway system.

To promote the practical operation of new transport systems both in new town areas and existing city areas, a subsidy system was introduced in 1974, i.e.

the infrastructure of a new transport system (such as columns and girders for elevated track) is considered as part of a road structure and is built by road developers (usually local governments) with state subsidies, and the operator of a new transport system is allowed to use the facility exclusively for operating new transport system service.

Here are the examples of new transport system developing for new towns and new communities.

"Tōkadaï New Town in Komaki" (Fig. 11)

(Outline of the Town)

This new town is located about 25 km northwest of the city center of Nagoya. It is being developed by Aichi Prefectural Government as a housing complex for workers who will commute to inland industrial areas around it and business districts in Nagoya.

Approximately half of the project has been completed and residents started moving in 1979.

Area	About 332 hectares
Planned Population	About 47,000
Development Period	1972 - 1985

(Outline of New Transport System)

As an existing railway line serving the new town, the Meitetsu Komaki line is running from Nagoya to the center of the city of Komaki.

The new transport system is designed to link the Komaki Station on the Komaki Line to the new town to meet the transportation demand of the new town. Construction work is under way and the start of operation is scheduled for 1983.

This new transport system is planned for the future to be extended to the Kozoji New Town (population 21,000) and further to the Kozoji Station on the Chuo Line of the Japan National Railways to complete an extensive communal transportation system.

The outline of the new transport system between Komaki Station and Takadai New Town is as follows:

Population during night	55,000
Population during day	42,000
Daily number of passengers	30,800
Number of passengers per one way and per one rush hour	5,500
Total length	7.66 km
Number of stations	7
Capacity	70 persons x 4 cars
Minimum operation interval	2 min. and 30 sec.

"South Port District in Osaka" (Fig. 13)

(Outline of the Osaka South Port Town Project)

The Osaka South Port Town is a new urban area which has been constructed by reclaiming a south part of the Port of Osaka. Harbour facilities, various service and office buildings, residences, a large scale park, etc. have been constructed in this Port Town.

Planned area: 920 ha

Land utilization program:

Harbour functional area	47.0%
Residential area	6.7%
Park and green area	8.4%
Office, distribution and industrial area	20.9%
Roads and revetment area	17.0%

(Outline of the New Transportation System)

Currently, bus service is operated between the Port Town and the center of Osaka. To cope with the possible increase in transportation demand in the future, a combination system of bus and railway services has been planned. This system is to connect various parts of the Port Town to the existing subway station.

Population during night	45,000
Population during day	57,000
Daily number of passengers	70,000
Number of passengers on one way and per one rush hour	12,000
Total length	6.9 km
Number of stations	8
Capacity	72-75 persons x 6 cars (4 cars initially)
Minimum operation interval	2 min. (3 to 4 min. initially)

"Kobe Port Island" (Fig. 14)

(Outline of the Kobe Port Island Project)

The Kobe Port Island is a new urban area which has been constructed by reclaiming a part of the Port of Kobe. Harbour facilities, various service and office buildings, facilities such as convention and exhibition halls, hotels, residences, a large scale park, etc. are now under construction in this Port Island.

Planned area: 436 ha

Land utilization program:

Harbour functional area	53.0%
Residential area	5.5%
Park and green area	5.5%
Office, distribution and industrial area	17.7%
Roads and revetment area	18.3%

(Outline of the New Transportation System)

The Kobe Port Island is expected to be a new center of Kobe City. Therefore, new routes have been designed so that they connect directly the existing city center to various parts of the Port Island. Inside the Island, a loop of a single track has been planned.

Population during night	20,000
Population during day	30,000
Daily number of passengers	68,000
Number of passengers on one way and per one rush hour	10,000
Total length	6.4 km
Number of stations	9
Capacity	75 persons x 6 cars
Minimum operation interval	2 min. 30 sec.

--- Construction of Bicycle Lane and Pedestrian's Path ---

Most of the end trips and internal trips within a new town are either on foot or by bicycle. Though these are primitive transportation means, they can not be replaced by other transportation means for short distance travels in such respect as (1) they do not require energy, (2) they are available at any time and (3) they do not require large space.

Areas within 800 meters from the nearest station, shopping center, school, park and other facilities can be covered by foot and areas within two to three kilometers can be covered by bicycle.

In the past, pedestrian's paths were provided as sidewalks along auto traffic roads and bicycles used to run either

on auto traffic roads or sidewalks, avoiding care or walkers.

Since new consideration is now being given to walk and bicycle travels from the view point of saving energy as well as ensuring safety and convenience of the travelers, construction of pedestrians' paths and bicycle lanes is under way at a rapid pace.

Bicycle lanes and pedestrian's paths must have functions, one for linking residents' homes to the nearest station, shopping center, school, parks, and other facilities as well as between facilities and the other for providing daily recreation space. Unless sufficient consideration is given to these aspects, the bicycle lanes or pedestrian paths will not be used effectively.

Bicycle traffic will become more efficient when bicycle parking lots at stations, shopping centers, etc. are provided effectively.

To enhance more effective use of bicycle traffic, "the community cycle system" is now being studied. This is designed to promote more efficient use of bicycles and bicycle parking lots through public ownership of the bicycles and facilities within a certain zone.

As an efficient utilization of bicycles, the Meimai New

Town system was experimentally carried out. The New Town is located in a high place of the hill and the nearest railway station is at the foot of the hill. Distance between both places is about 3.5 km. In this system; commuters ride down the hill to the station by bicycles, used commonly, and ride up the hill to the New Town by buses; these bicycles are sent back by trucks; commuters who join this system pay monthly a certain amount of membership fee.

The above experimental trial was significant in the common use of bicycles and active use of bicycles for the means of commuter transportation. However, the Meimai New Town system was experimented for two years, then discontinued. This resulted mainly from the fact that (1) because bus services were improved, number of bus commuters increased, (2) the membership fee was too low to pay, (3) rate of utilization of the system was low in winter, (4) since bicycles with change gears and motor-bikes have been popularly used, riding-up a hill has not been a problem.

It is expected to operate a further new system for highly utilizing bicycles on the basis of the above-mentioned experiment.

The construction of pedestrian's paths must be expanded as

part of measures to save the transportation poor as well to serve general pedestrian traffic, giving careful consideration to road structures, scenic beauty, access to various facilities, design of places for crowds and rain shelters, etc.