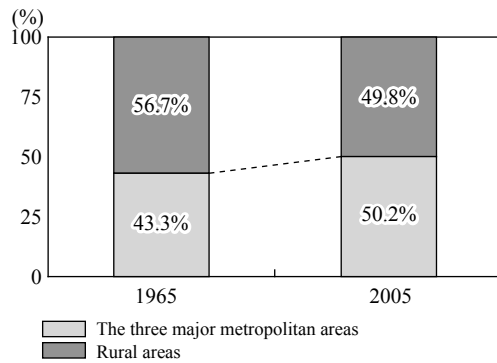


[Issues accompanying the centralization of populations, traffic, etc., and the incidence of settlement isolation]

○ The centralization of populations, traffic, etc.

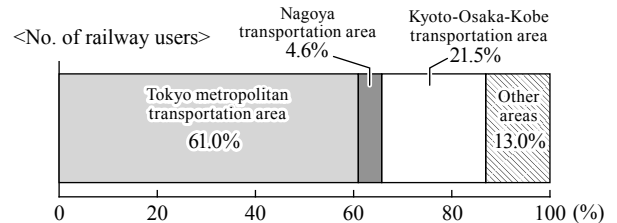
The movement of populations from rural areas to urban areas during Japan's period of high economic growth brought on the centralization of population, assets, and so on in primarily urban areas. Traffic is also concentrated in urban areas as a result of centralization of populations and so forth.

Status on the Centralization of Population in Urban Areas



Note: Figures for 2005 are from a summary tabulation table
Source: Compiled from Ministry of Internal Affairs and Communications, *Kokusei Chousa* (Population Census)

Status on the Centralization of Traffic toward Urban Areas



Notes: 1. Tokyo metropolitan transportation area: the area within a 50km radius of Tokyo Station
Nagoya transportation area: the area within a 40km radius of Nagoya Station
Kyoto-Osaka-Kobe transportation area: the area within a 50km radius of Osaka Station
2. From FY 2002 data
Sources: Compiled from Institution for Transport Policy Studies, *Heisei 16 Nen Ban Toshi Koutsuu Nenpou* (Annual Report on Urban Transportation 2004) for the three major metropolitan transportation areas, and from MLIT, *Heisei 14 Nendo Ban Tetsudou Toukei Nenpou* (Annual Statistical Report on Railway Transport FY2002) for the whole country

○ Increases in the vulnerability of urban areas to natural disasters

(1) The occurrence of fires during earthquakes, and other disasters in crowded city quarters

Crowded city quarters are at high risk for damage such as the collapse of houses during earthquakes as well as multiple simultaneous outbreaks of fires or large-scale fire propagation due to factors like decrepit wooden buildings packed densely into small plots of land, numerous small streets, and the scarcity of parks and other open spaces.

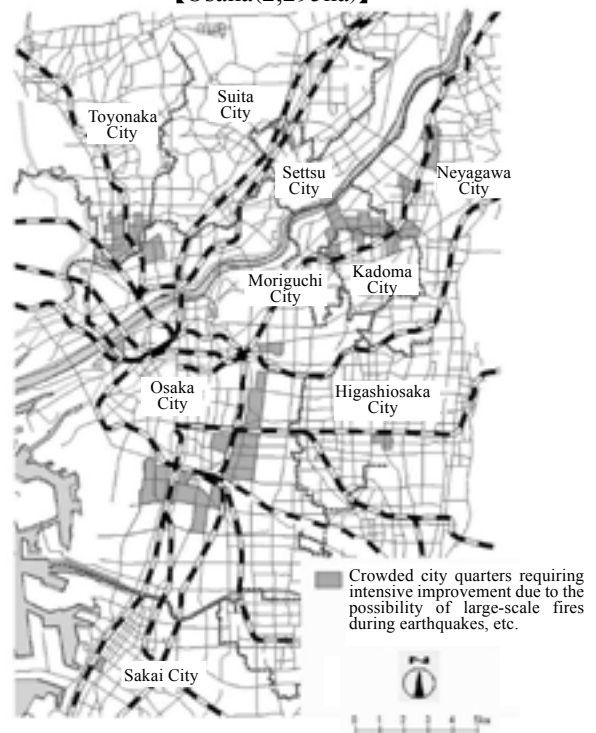
The Distribution of "Crowded City Quarters Requiring Intensive Improvement Due to the Possibility of Large-Scale Fires during Earthquakes, Etc." (Tokyo, Osaka)

【Tokyo(2,339ha)】



Source: MLIT

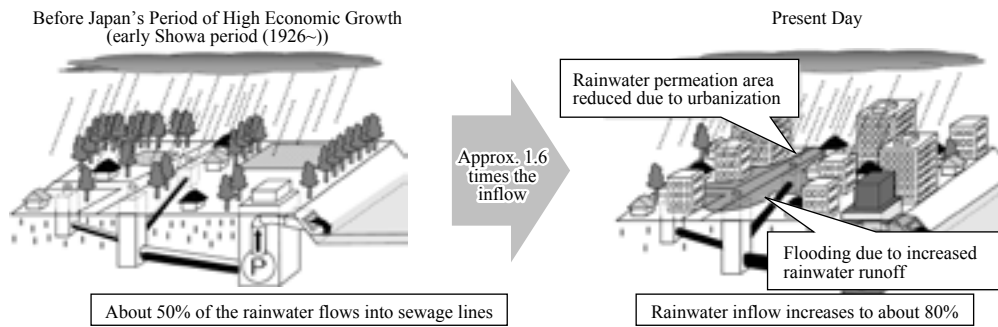
【Osaka(2,295ha)】



(2) The spread of damage due to landside water

With the formation of cities comes the covering of the ground surface in many areas with concrete, asphalt, and so on, interfering with the permeation of rainwater into the underground. Therefore when a large amount of rain falls in a short time span it flows into the sewage lines and other drainage systems all at once and does not get eliminated into the rivers. In this way, poor drainage system often cause extensive damage to urban areas with commensurate heavy financial costs.

Changes in the Amount of Rainwater Flowing into Sewage Lines in Tokyo



Source: Tokyo metropolis data

(3) Flooding of underground facilities

As intensive use of land in urban areas continues, installation of underground shopping malls, cellars, and so on is increasing. There is a risk in underground facilities like these that they will be penetrated by water in a short time span and inundated as a result of torrential rains and flooding, possibly exposing not only property but also human lives to risk due to failure to escape, entrapment, and so on.

(4) Damage relating to tall buildings

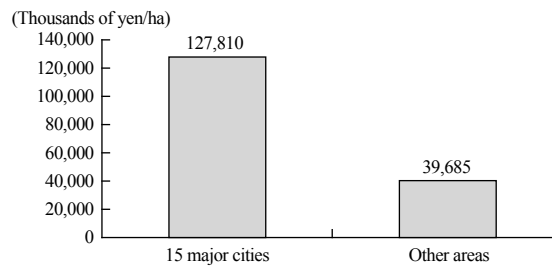
As intensive use of land in urban areas continues, tall buildings are increasing in number. This increase is bringing damage relating to tall buildings, like the case where an earthquake with epicenter off the western coast of Fukuoka Prefecture in March, 2005 caused the windows of an office building to break, scattering glass on the road below, and the case where people were trapped for an extended period of time when an earthquake with epicenter in the northwestern part of Chiba Prefecture in July of the same year caused a disruption in elevator operation.

(5) The possibility of large-scale damage

In relation to the vulnerabilities mentioned earlier, in urban areas where population, assets, traffic, and so forth are densely concentrated, natural disasters like earthquakes can bring serious devastation, with anticipated vast numbers of people having difficulty returning to their homes.

In terms of flood damage as well, when comparing the monetary damage per unit area in 15 major cities with that of all other areas we find that in major cities where assets are centralized the damage is significantly higher than in other areas.

Comparison of the Density of Flood Damage to General Property in 15 Major Cities with that of Other Areas



Notes: 1. Density of flood damage to general property refers to the monetary damage to general property divided by the flooding area of residential zones, etc.
 2. 10-year average from 1994 to 2003
 3. Includes damage from business suspension and loss. Value is the 1995 value.
 4. 15 major cities: the Tokyo wards and 14 government-designated cities; Other areas: all other areas of Japan
 Source: MLIT

○ Accidents and other problems and effects of centralized traffic

(The impact of accidents, transport disorder, and so on in urban transportation facilities)

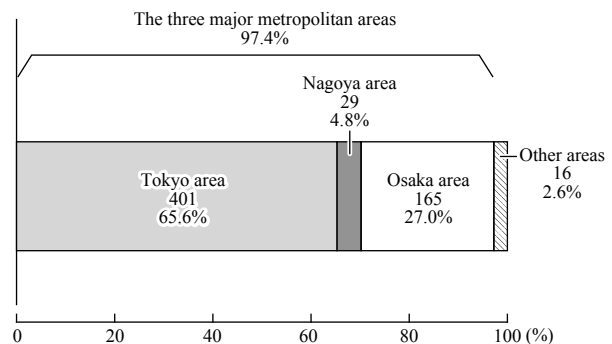
When railways, airports, and other infrastructure in urban areas with centralized traffic is hit by accidents, transport disorder, and so forth, like the earthquake with epicenter in the Northwestern part of Chiba Prefecture on July 23rd, 2005 and the trouble with power supply facilities that occurred at Tokyo International Airport (Haneda) on August 2nd of the same year, many users of this infrastructure are affected in cases where it takes time to bring operations or navigation back on line.

Additionally, as the functioning of many transportation facilities has now come to rely on information systems, the risk of disruptions in service or degradation of functioning has become high due to intentional causes like cyber attacks, unintentional causes like human error, and even natural disasters like earthquakes. It seems that the socioeconomic impact would be especially high if these kinds of IT disturbances struck the urban transportation facilities that are the hub of the transportation network.

(The necessity of provisions for railroad crossings in urban areas)

More than 95% of the so-called “un-opening railroad crossings,” where traffic is blocked for 40 minutes or more per hour at peak times, are concentrated in the three major metropolitan areas. Strengthening and quickening of provisions for crossing gates toward eliminating problems like “un-opening railroad crossings” is being sought from the standpoint of preventing accidents at crossing gates and smoothing traffic flow in urban areas where traffic is concentrated.

Proportion of Nationwide “Un-opening Railroad Crossings” Located in the Three Major Metropolitan Areas



Notes: 1. The three major metropolitan areas: Tokyo area (Tokyo, Kanagawa Prefecture, Saitama Prefecture, Chiba Prefecture), Osaka area (Osaka Prefecture, Hyogo Prefecture, Kyoto Prefecture, Nara Prefecture), and Nagoya area (Aichi Prefecture, Gifu Prefecture, Mie Prefecture)
 2. Data from the year 2004
 Source: MLIT

○ Incidence of settlement isolation

While urban areas have their own unique safety and security issues, non-urban areas also have their own unique issues for their areas.

Settlement isolation has become more common in connection with topographical characteristics, transportation access, and so on when natural disasters occur in the semi-mountainous and coastal areas that make up about 70% of the area of Japan’s national land. In settlements isolated by natural disasters, cut off access to neighboring areas causes difficulties in extraction, rescue, relief, and restoration efforts for the whole settlement. Furthermore, in semi-mountainous areas where there is advanced depopulation and declining birthrate coupled with population aging there is concern over the fact that even with the risk for isolation these settlements face, the local disaster prevention capacity is being degraded due to the aging of the population.

For settlements at risk for isolation by natural disasters it is therefore necessary to make efforts to secure access to other areas in times of disaster, as well as to consider the policy on provisions for when these access routes are disrupted.