

The JORSALogo features the word "JORSAL" in a bold, white, sans-serif font. The letter "O" is replaced by a red circle, which is a stylized representation of the Japanese flag's sun disk. The background of the entire page is black with a complex, white circuit board pattern. A large, stylized red and black graphic, resembling a stylized "J" or a train track, is positioned on the right side of the page.

JORSAL

JAPAN OVERSEAS RAILWAY SYSTEM ASSOCIATION

Tekko Bldg. 3F, 1-8-2 Marunouchi, Chiyoda-ku, Tokyo 100-0005 JAPAN

TEL : +81-3-3201-3146 FAX : +81-3-3201-3143

<http://www.jorsa.or.jp/en/> E-mail : infoweb@jorsa.or.jp

Copyright © AUG. 2018 JORSA All rights reserved. Printed in Japan 4000 AP

URBAN TRANSPORTATION SYSTEMS IN JAPAN

JAPAN OVERSEAS RAILWAY SYSTEM ASSOCIATION

URBAN TRANSPORTATION SYSTEMS IN JAPAN

JORSAL
JAPAN OVERSEAS RAILWAY SYSTEM ASSOCIATION



Introduction

Developing a transportation network is one of the most important measures that can be taken to facilitate urban renewal, boost development, and improve the environment. Public transportation in cities is a network of routes operated by different transportation systems.

Track-based urban transportation systems, in particular, are excellent transportation means for commuting, running businesses, and conducting daily activities. They deliver convenient and speedy services that help stimulate economic activities and provide a safe and reliable transportation environment, thereby contributing to the continuation of city functions and sustainable development.

The Japanese railway system adopts an integrated approach, from planning and development to construction, operation, maintenance, and human resource development, making it an excellent system in both hardware and software. It will be a meaningful endeavor to introduce Japan's high quality railway system overseas to meet the diverse needs of countries in the world.

For this reason, the Japan Overseas Railway System Association (JORSA) prepared this brochure, Urban Transportation Systems in Japan, to give an overview of the Japanese urban transportation systems, explain the features of various systems using the latest data, and provide a guide to the introduction of Japanese railway system overseas.

The "track-based transportation systems" mentioned here include urban rapid rail transit, linear metro, AGT/APM, monorail, and LRT・tram but not bus, automobile, ship, or aircraft. Since the subject is "urban railway", Shinkansen and other inter-city railways (the so-called "mainline railways") are not covered.

Since an urban transportation system is an amalgamation of diverse, individual technologies, this brochure presents rolling stock technology, as well as the technologies of different fields. It also highlights areas that require special attention when introducing an urban transportation system, and operation expertise to enhance understanding.

We hope policy-makers and railway professionals who are planning to develop an urban transportation system in their countries will use this brochure as a reference material. We also hope that the brochure will draw the attention of many stakeholders and help them better understand how an urban transportation system is developed.



Contents

1. Find the Best-fit System	2
2. Importance of Developing a Transportation Network in the City	8
3. Advantages, Superiority and Development Effects	16
4. Technologies of Japan's Urban Transportation Systems	
4-1. Integrated Technology	22
4-2. Technologies of Various Systems	28
5. Functions and Adaptation Conditions	50
6. Process to Carry a Design into Execution	52
7. Management of Urban Transit Systems	58
8. Global Footprint	66
9. References	68



Urban transportation is key to building a rich and fulfilling society

Public transportation in cities is a transportation network made up of routes connecting the suburbs and the city center, as well as routes in the city center that give access to different districts by utilizing desirable transportation features, such as mass transportation, high speed, safety, and reliability.

Urban transportation shoulders the key functions of a city. It plays an important role as a transportation means for commuting, conducting businesses, and facilitating people's daily lives. Urban transportation fulfills the diverse needs of users by providing access to main transportation facilities, such as airports and Shinkansen, major public facilities, and venues of attraction.

In this way, urban transportation is key to the realization of a rich and fulfilling society. It facilitates social economic development, improves the living environment, and contributes to a safe and secure society.

As city development, urban renewal, and environmental improvement are gaining momentum in cities around the world, developing a new transportation system and improving the existing transportation network are extremely effective means for solving urban problems.

Various urban transportation systems highlighted in this brochure

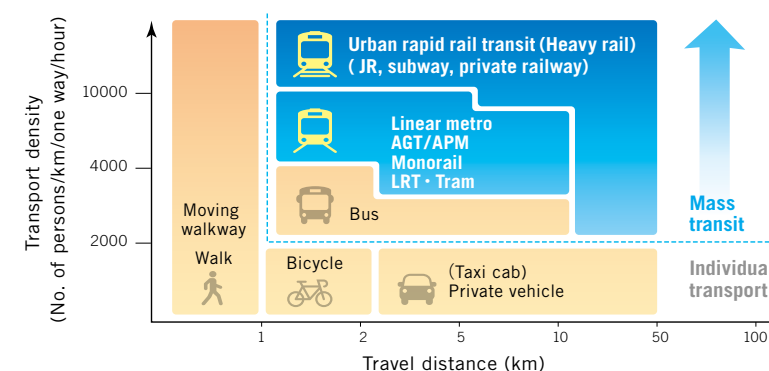
Urban transportation is made up of many systems, including urban rapid rail transit (conventional railways, such as JR[※] lines, private railway lines, and subways in Japan), linear metro, monorail, automated guideway transit (AGT), automated people mover (APM), light rail transit (LRT), tram, bus, automobile, bicycle, and the like.

This brochure focuses on track-based systems as a public transportation means. However, it is necessary to start by conducting a simple comparison of track-based systems with other means of transportation in the city.

- For example, subway, which is an urban rapid rail transit system in the city, can handle transportation demand of tens of thousands of people per hour. It is a mass transportation means capable of operating at a speed of about 30 km/h, making it an indispensable transportation means for commuter transport in big cities.
- Automobile provides door-to-door convenience and the traveling distance per hour can be long depending on the road condition. However, its transportation efficiency is poor due to the capacity limit per vehicle and its transportation capacity per hour is low, compared to public transportation.
- The transportation volumes of bicycle and walking can be tens of thousands of people per hour if the roads are wide or if there are moving walkways. However, the travel distance is at most about 2 km.
- City buses are a public transportation means. They are used for relatively short-distance travel of about 5 km to meet the transportation demand of several thousand passengers per hour. However, road congestion caused by an increase in the number of vehicles has lowered the scheduled speed of buses and affected their punctuality, preventing them from fully performing their function. This result in a decline in service level and the reduction of users will eventually force some routes to close. Buses are also linked to road congestion, air pollution, and other urban problems. In recent years, bus rapid transit (BRT) equipped with sophisticated functions, such as speediness, punctuality, and high transportation capacity, has been introduced in some areas. However, the BRT system is premised on a combination of good road conditions, articulated buses, bus lane, priority system, and so on.



Scope of application of urban transport systems



※ JR : Japanese National Railways being divided into six regional passenger railway companies and one freight company in 1987.