New Urban Railway Projects

Sakai City LRT Plan

City Department of Construction and Urban Planning

Introduction

Sakai City is in the Kansai district south of Osaka. In Japan's medieval period, it was called the city of freedom and was a thriving base for overseas trade. It merged with Mihara Town in February 2005 to become Japan's 15th city designated by government ordinance in April 2006 with a population of about 830,000.

The recent urban structure has formed mainly in the north–south axis along the flow of people and goods towards central Osaka, lessening Sakai's sense of individuality as an independent city. Against this background, the city is aiming for urban development as a nucleus for southern Osaka Prefecture by building communities of distinctive character that make use of historical cultural assets, such as the Mozu tumulus cluster and Nintoku-ryo tumulus, and traditional industries.

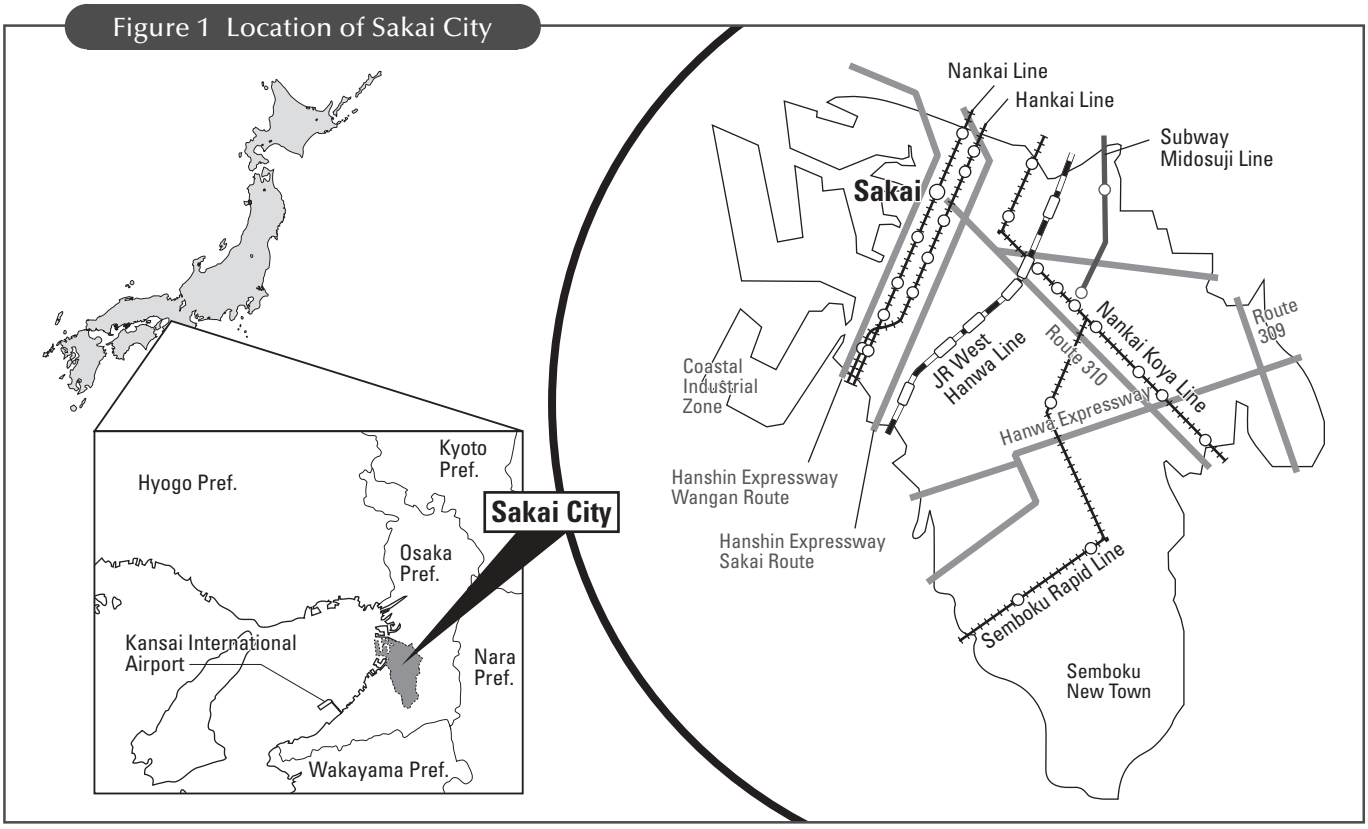
LRT Plan

Current railway network

Six routes currently operate within Sakai City—Nankai Electric Railway's Nankai Line, Hankai Line, and Koya Line, and JR West's Hanwa Line, Midosuji subway and Semboku Rapid Railway (Fig. 1). All run north–south to connect Sakai City and Osaka City. Therefore, construction of an east–west railway transport axis supporting an independent urban sphere for Sakai City has long been a subject of popular conversation.

In addition, the only tramcars remaining in Osaka Prefecture run on the Hankai Line and Uemachi Line operated by Hankai Tramway. Citizens have enjoyed the familiar Hankai Line for nearly 100 years following the start of service between Ebisucho (Osaka City) and Oshoji

Figure 1 Location of Sakai City



(Sakai City) in 1911. However, due to the rapid spread of motor transport in the late 1960s and changes in the transport environment, the current number of rail passengers in Sakai City has fallen to around about 15% of the peak in 1961, and promoting rail usage is an important factor in assuring continued service.

Feasibility studies

There have been plans for an east–west railway in Sakai City for quite some time. In 1920, Kinki Nippon Railway obtained a licence for a section between Sakai and Furuichi. Then, in 1961, Nankai Electric Railway applied for a licence between Sakai and Yao. However, neither of these plans came to fruition.

However, development of the Osaka Bay area increased from 1990, leading to requests for transport access to the coastal area. Taking advantage of this momentum, the Council for Sakai Public Transport comprised of leading academic and business figures was established with the aim of building an east–west railway (Fig. 2). In 1994, this Council issued the report entitled 'The Proper Form of Railway Construction,' which supported the need for an east–west railway. Subsequently, Sakai City worked to enhance its project promotion system, established a railway construction fund, and promoted studies toward building an east–west line using a mini-subway or new transport system, etc.

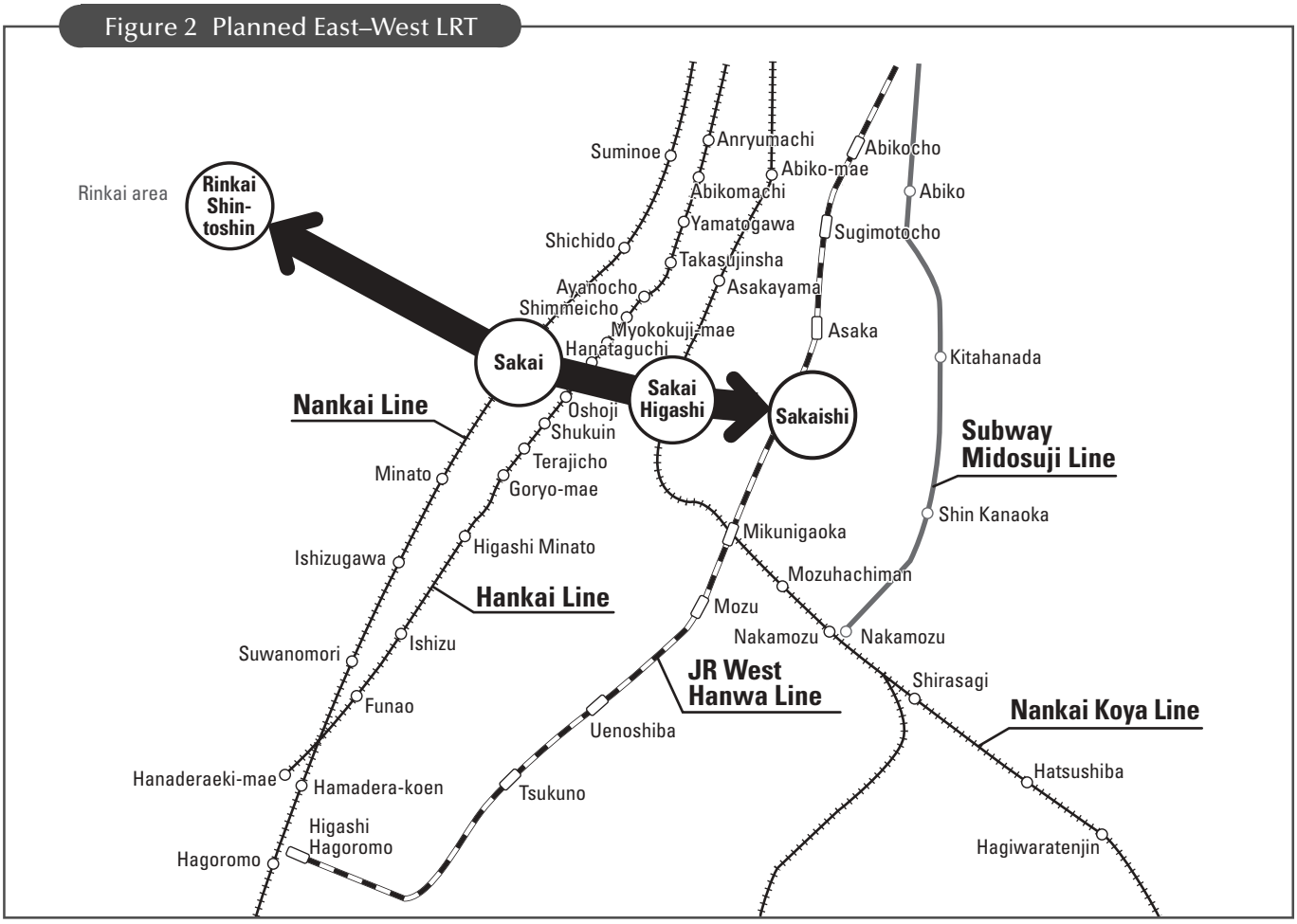
In 2003, the Council was reorganized and suggested the feasibility of introducing a light rail transit (LRT) system for the east–west line. Compared to subways and other new transport systems, LRTs are more barrier-free and people-friendly, have superior scenic and environmental functions, and lower construction costs. Therefore, further studies were conducted from various perspectives based on these and other features.

In addition, the Council for Kinki Regional Transport (an advisory body to the Kinki District Transport Bureau of the Ministry of Land, Infrastructure and Transport) issued a report in October 2004 on the 'Desired Form of Transport in the Kinki Region.' It included the item 'Sakai City east–west railway: Sakai No. 2 section–Sakai–Sakai Higashi–Sakaishi, 8.3 km' in the LRT section.'

Construction goals

By connecting with major stations on the north–south railway lines, the east–west LRT aims to reinforce the east–west transport axis; correct the north–south transport bias; promote community building along the line; and create Sakai City's own independent urban sphere.

Figure 2 Planned East–West LRT



Route

Table 1 summarizes the planned route. Although various possible route alignments were examined, the section between the Rinkai area and Sakai Station is now focused on the Sambo route (Fig. 3), which is expected to have the highest demand based on current wayside land usage and future community building efforts. The section between Sakai Station and Sakai Higashi Station is centred on the Oshoji route, because it is the central axis of the urban district and considering the effects of operations on automobile traffic. The section between Sakai Higashi Station and Sakaishi Station requires further study of the interchange with the Nankai Koya Line crossing in the north–south direction, and also community building trends east of Sakai Higashi Station (Fig. 4).

Early Service Start and Construction of Urban Transit System

Need for early service start

The best situation would be a simultaneous service start on all sections from the Rinkai area to Sakaishi Station. However, to revitalize and create an attractive urban scene, Sakai municipal government wants to start services between Sakai Station and Sakai Higashi Station (1.7 km) as soon as possible.

In addition, ensuring smooth connections with existing railways and using feeder buses will create a convenient urban transit system centred on the LRT, increasing the number of trips to the urban district and activating business prosperity (Fig. 5).

Table 1 Planned East–West LRT Route

Interchanges	Sakai Station on Nankai Line Sakai Higashi Station on Nankai Koya Line Sakaishi Station on JR West Hanwa Line
Statistics Length: Demand density: Candidate route:	 8.3 km 23,156 passenger-km Sambo route and Oshoji route (Fig. 3)

Figure 3 Route Studies

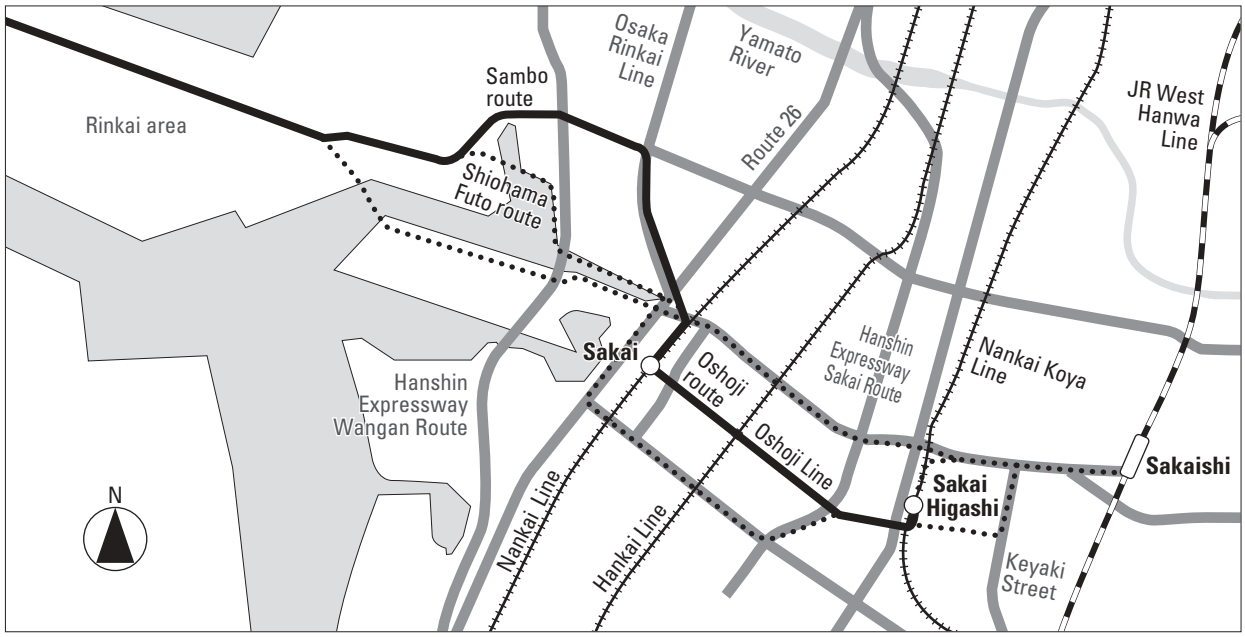
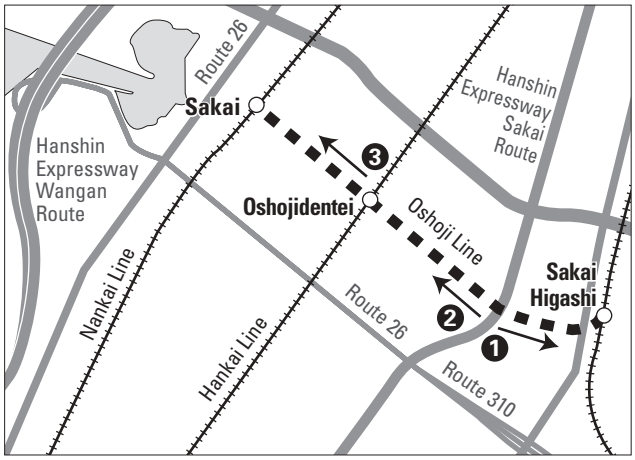


Figure 4 Map of Photograph Locations

Oshoji Route at ❶

Oshoji Route at ❷

Oshoji Route at ❸



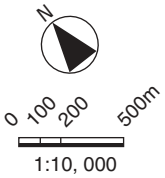
(Photos: Sakai City Department of Construction and Urban Planning)

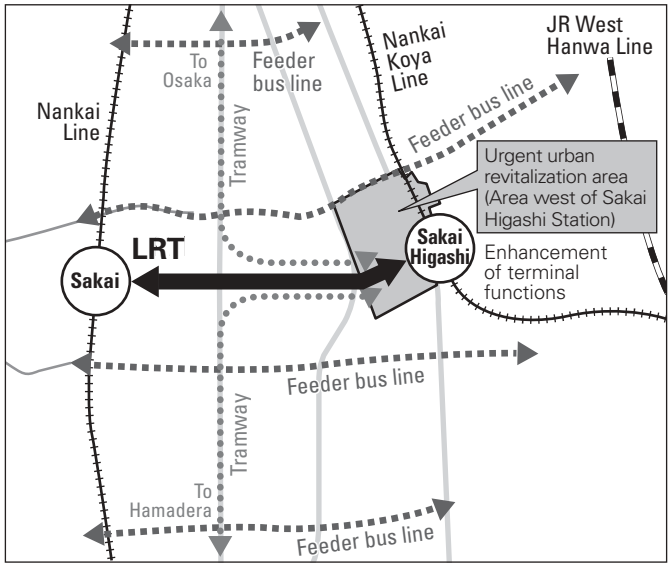
Figure 5 Convenient Urban Transit System

◎ **Need for early service start**

* Need for vitalization of urban district

LRT will:
- Improve urban trips
- Promote community vitalization

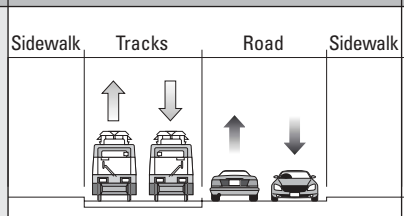
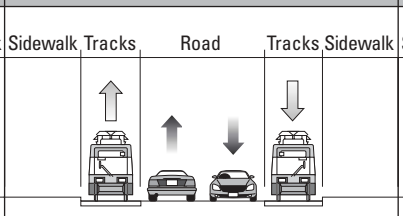
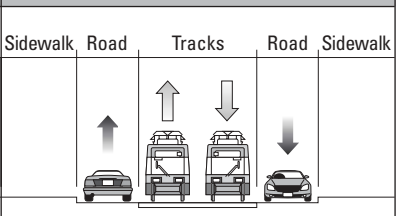




In addition to LRT introduction:
- Smooth connections at railway stations
- Through operations with Hankai Line
- Introduction of feeder bus lines, etc.

Construction of convenient urban transit system

Table 2 Position of LRT on Road

LRT Position	Verge	Outside	Centre
Outline drawing			
Characteristics	• Train runs next to sidewalk, so passengers can get on and off directly • Care required when parking on LRT side • Care required when loading and unloading goods along road on LRT side	• Passengers get on and off directly from sidewalk • Care required when parking on LRT side • Care required when loading and unloading goods along road	• Easy loading and unloading of goods along road • Easy parking • Passengers must cross road to get on and off LRT

Position of LRT on road

The impact of the LRT on other road users, especially cars, is being studied with focus on the road centre and verge (Table 2).

Project scheme

Overseas, LRTs are often constructed with public funds. However, the basic policy in Japan is to construct railways by repayment of construction costs. Moreover, the Railway Business Law forbids vertical separation of construction and operation, so building an LRT using public funds to support profitable operation by the private sector is an issue.

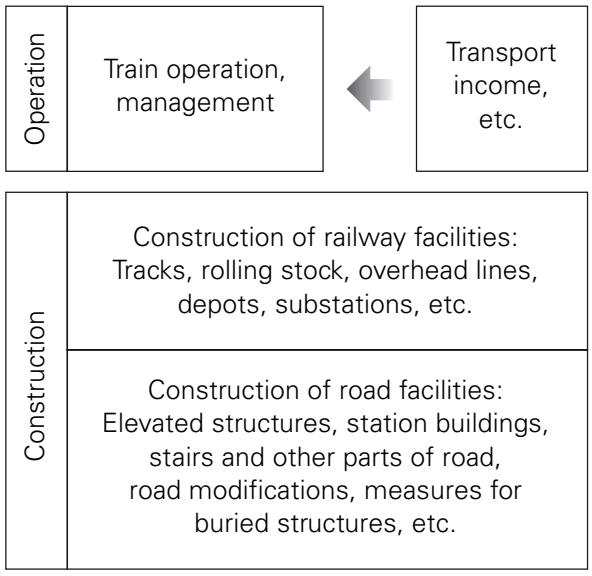
Therefore, funding studies of this scheme have centred on a vertically separated public private partnership (PPP). Under this method, construction costs for road facilities, such as road modification works and tram stops, and for railway facilities, such as rails, rolling stock and depots, are borne by the public sector (city or other public body), and the railway is then managed and operated by a private sector. In addition, public proposal is being considered as a method for deciding the operator (Fig. 6).

Links with Hankai Line

About 7.9 km of the Hankai Line tramway (14.1 km) between Sakai City and Osaka City is within Sakai City and the Hankai Line also crosses the Uemachi Line (4.6 km), another tramway in Osaka City.

Building the first 1.7 km of the east–west LRT as planned would create a tramway network with the Hankai and Uemachi lines, permitting through operation on each line and enhancing the overall transport effect.

Figure 6 Project Scheme



Future Approaches Supporting East–West LRT

Education and consensus building

One issue for trams in Japan is their strong negative image as an outdated and inconvenient transport mode, because the difference between LRTs and tramcars is not clearly understood. In addition, it is necessary to build a popular consensus among wayside residents and other citizens in favour of building the LRT.

Sakai City is working to provide easy-to-understand explanations about the LRT's convenience and environmental friendliness and the role it will play in community building. These activities include holding local lectures and sending speakers in response to requests from various groups. In addition, the Sakai LRT Research and Exchange Center was established as a joint project with Osaka Sangyo University in September 2005. It is conducting various educational activities and promoting research and exchanges on building attractive and prosperous communities.

Study of public transport policies integrated with LRT

Public transport policies integrated with the LRT are being studied to create a pedestrian-centric transit system in the urban district. Subjects include a simple tariff and fare collection system, easy transfers with other transport modes, barrier-free through operation with the Hankai Line, smooth movement in the urban district, and on-time operation.

Integration with community building

Integration with surrounding communities must be studied to aid revitalization. In addition to building the LRT, integration includes strengthening commercial and business functions, establishing a government and municipal office zone, making use of existing historical and tourism assets, constructing tourism and cultural centres, promoting redevelopment projects, and promoting facilities that attract customers.

Securing finances

The guiding principle for building new railways in Japan uses the build, own and operate (BOO) method. However, declining population and passenger levels make it difficult to secure private funding for constructing new lines. In these circumstances, the importance of public transport is being emphasized based on environmental friendliness, convenience for an aging society, and reversing inner city decline. Following successful introduction of LRTs in Europe and the USA, in FY1997, the Japanese Ministry of Land, Infrastructure and Transport established a programme to make space on roads for tramways, and the LRT Infrastructure Project in 2005. However, adoption of novel funding measures, such as issuing of bonds by local municipalities to alleviate the capital burden on operators, has not been approved yet, explaining the lack of progress in public funding of LRT construction.

Future measures, such as vertical separation of infrastructure and operations, PPP funding, novel financial assistance, etc., still need discussion.

Conclusion

Increasingly serious issues such as environmental degradation, global warming, aging societies, etc., are forcing us to refocus our cities and lifestyles based on a modal shift from the automobile to convenient and efficient public transport. Experience in other countries such as in Europe and the USA shows that LRTs are people- and environment-friendly and contribute to revitalization of communities. Sakai City aims to enhance the overall attractiveness and vibrancy of its community. This includes using public transport facilities to access its many historical and cultural assets, such as temples and shrines, ancient burial tumulus including the Nintoku-ryo tumulus (circa 400AD), tourism centres, and other facilities.

In the future, the city intends to facilitate better east–west traffic flows by building an LRT that will connect with other transport networks in the region. Reaching this goal requires consensus building with citizens, discussions between transport operators and related parties, and novel funding methods, such as vertically separated PPP methods.

Sakai LRT Research and Exchange Center

Organizer:	Osaka Sangyo University
Established:	September 2005
Hours:	11:00 to 17:00 (closed Saturdays, Sundays, Public Holidays)
Address:	1-10, Kainochohigashi 2-cho, Sakai City (in Yamanoguchi shopping district)
Director:	Professor Masahiko Tsuchihashi (Faculty of Human Environment, Department of Urban Environment)
Activities:	1. Introducing LRT 2. Performing LRT-related research 3. Recording promotion of east–west LRT 4. Holding exchange activities about LRT and community building 5. Promoting continuance and vitalization of Hankai Line