

Waterfront Functions Required from a Ship Transport Perspective

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Synopsis

Waterfronts perform various functions such as sites of ‘bustling’ and ‘healing’. From the viewpoint of the involvement of river area residents with rivers, it is important to develop waterfronts utilizing these functions. Devoting attention to needs related to ship transport which used to be an important interface between river and residents along the Yodo River, this study elucidates concrete measures for activation of ship transport and investigates functions that are required at the waterfront of the Yodo River.

KEYWORDS: waterfront development, river ship transport, activation of ship transport, wharf, crisis management

1. Background and Objectives of Research

In recent years, the maintenance of urban rivers involves activities for waterfront development that include environment improvement and recreational utilization, in addition to flood control and water utilization. However, no method for waterfront development that is suitable for urban rivers has been established to date, because conditions and environments for the development include diverse and complicated factors for every river and region.

This study, with examination from perspectives of facility, utilization, landscape, and social involvement, advances research for the overall concept of waterfront development in urban rivers. By using questionnaire/hearing survey results, current problems are examined according to needs for ship transport which used to be an important interface between river area residents and the old Yodo River. Then the orientation of functions necessary for the waterfront at present is investigated. Concrete measures for the activation of ship transport are discussed.

Since ancient times, the Yodo River has served as a main artery of ship transport, supplying needs for goods distribution and passenger transportation between Osaka Bay and the Kyoto area. At the zenith of its prosperity, from the Muromachi Period to the Edo Period (until 19th century), more than 1,000 vessels (Sanjukkoku-bune junks, Kurawanka-bune junks, and river ferries; see Figure 1) came and went along the river; the wharfs and posting stations which served as their bases were invariably crowded¹⁾. However, at the end of the Meiji Period (early 20th century), ship transport started to follow a course of decline after land transportation was developed because of provisions and improvements of railroads and roads. At present,

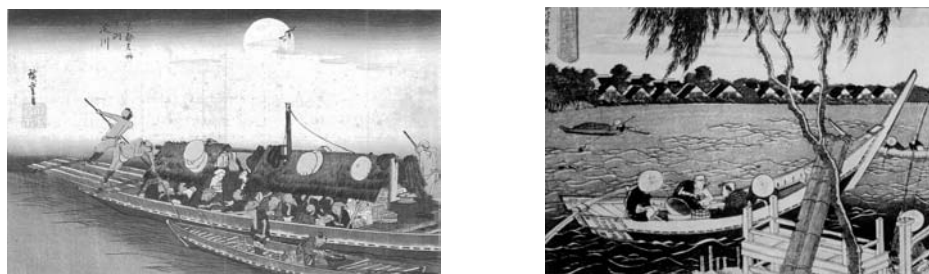


Figure 1 Left: Sanjukkoku-bune junk and Kurawanka-bune junk (“Yodo River”, *Kyoto Beauty Spots*, painted by Hiroshige). Right: Landscape of ferry (“Miyado River, Naganawa”, *Chienoumi*, painted by Hokusai).

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their connection with residents and society has become extremely tenuous. Recently, ship transport is being reconsidered for sightseeing purposes during normal times and as an alternative transportation in land traffic paralysis in a wide-scale disaster such as an earthquake. Various measures are now being promoted towards the activation of ship transport. The reality, however, is that only gravel carriers and unscheduled sightseeing ships are operating, which have not become a part of people's lives

2. Present Needs and Problems related to Ship Transport

2.1 Ship transport needs

We use the result summary of investigations performed by the Yodo River Office, Kinki Regional Development Bureau to ascertain needs for ship transport along the river²⁾. This investigation was conducted to examine basic concepts for evaluating ship transport and to obtain basic data for preparation of a 'Target picture of ship transport along the Yodo River (draft)'. The objective is to elucidate needs related to ship transport along the Yodo River, and particularly, the following items were surveyed through a questionnaire and hearing (see Table 1): a) Awareness and utilization consciousness of ship transport facilities for 2,035 residents along the Yodo River; b) Willingness to use ship transport and to bear financial burdens for municipalities along the Yodo River (2 prefectures, 9 cities, 1 town); c) Willingness to use ship transport facilities and to launch projects for 65 shipping agents (including 5 agents located upstream of the Yodo River great weir). The surveys with the questionnaire and the hearings were conducted during year of 2002–2003.

2.2 Results of surveys of needs and problems related to ship transport

Here are collected results of questionnaires and hearing of needs related to ship transport along the Yodo River below. Present problems are extracted from survey results.

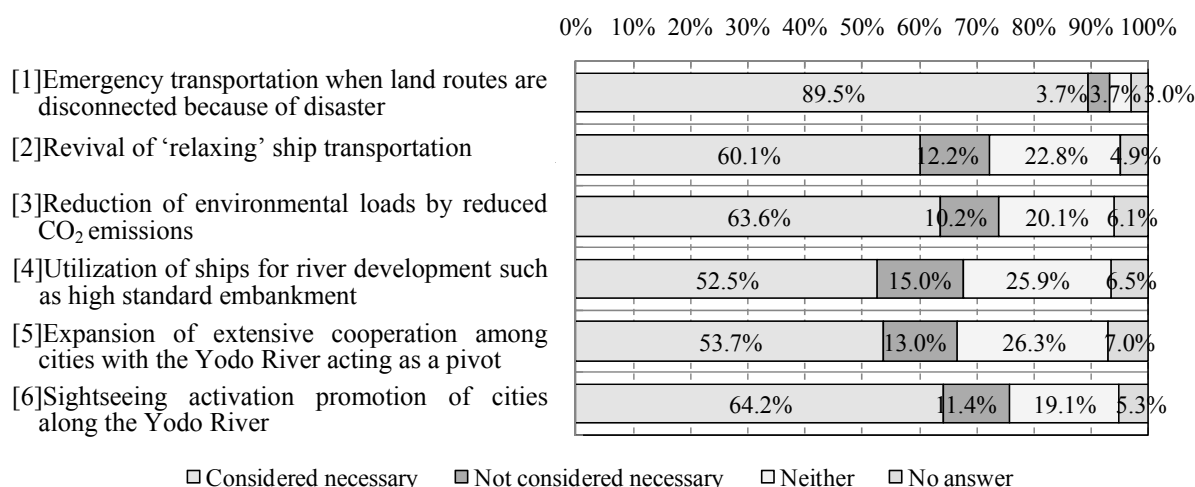
Table 1 List of surveys related to ship transport needs along the Yodo River

Survey name	Survey type	Outline of survey
Questionnaire of Yodo River Ship Transport (2003)	Questionnaire administered to residents (2003)	Sample: residents (2,035 people) along the Yodo River. Questions: Yodo River utilization status, frequency of use, demand for facility development, ship transport image, awareness of emergency wharf, intention for utilization by sightseeing, <i>etc.</i>
Survey of Municipalities along the Yodo River (2003)	Hearing from municipalities (2003)	Sample: municipalities along the Yodo River (2 prefectures -- Osaka, Kyoto, 9 cities -- Hirakata, Neyagawa, Osaka, Moriguchi, Settsu, Takatsuki, Kyoto, Uji, Yawata, 1 town -- Shimamoto) Questions: willingness to independent use of emergency wharf, willingness to bear financial burdens, ranking of Yodo River ship transport in urban planning, willingness of regional activation using Yodo River ship transport, cooperation of watershed cities, <i>etc.</i>
Survey of Business Institutions Related to Yodo River Ship transport (2002)	Questionnaire administered to the shipping agents (2002)	Sample: ocean and river shipping operators (65 operators including 5 parties located upstream of the Yodo River great weir) Questions: willingness to use emergency wharf, willingness to provide vessels in emergencies, willingness to launch a project along the Yodo River, <i>etc.</i>

a) Questionnaire administered to residents (2003)

First, to show items regarded as necessary to attain revival and activation purposes of Yodo River ship transport, results of six questionnaire items are presented in Figure 2. Needs for sightseeing activation promotion [6] and reduction in environmental loads [3] are high, revealing that more than half of respondents felt the necessity for ship transport. Particularly, the necessity of ship transport [1] as emergency transportation when land routes are disconnected at the time of disaster was highly appreciated (about 90%).

Furthermore, utilization of emergency wharfs for sightseeing, traffic and transportation during normal times (Table 2) is highly evaluated (about 70%), reflecting higher needs of utilization of ship transport by residents along the river. Awareness on the provisions and the improvements of the emergency wharf is low (Table 3) reflecting that ship transport is not presented efficiently to the public by administrative authorities (nation, municipalities along the river).



Item	Considered necessary	Not considered necessary	Neither	No answer	Total
[1]Emergency transportation when land routes are disconnected because of disaster	1,822 89.5%	76 3.7%	76 3.7%	61 3.0%	2,035 100.0%
[2]Revival of 'relaxing' ship transportation	1,224 60.1%	248 12.2%	463 22.8%	100 4.9%	2,035 100.0%
[3]Reduction of environmental loads by reduced CO ₂ emissions	1,294 63.6%	207 10.2%	410 20.1%	124 6.1%	2,035 100.0%
[4]Utilization of ships for river development such as high standard embankment	1,069 52.5%	305 15.0%	528 25.9%	133 6.5%	2,035 100.0%
[5]Expansion of extensive cooperation among cities with the Yodo River acting as a pivot	1,093 53.7%	264 13.0%	536 26.3%	142 7.0%	2,035 100.0%
[6]Sightseeing activation promotion of cities along the Yodo River	1,307 64.2%	232 11.4%	388 19.1%	108 5.3%	2,035 100.0%

Figure 2 Items considered necessary to achieve revival and activation purposes of Yodo River ship transport (n = 2,035) (Questionnaire administered to residents (2003), Question 3)

Table 2 Evaluation of emergency wharf of the Yodo River, emergency transportation, and utilization of emergency wharf for sightseeing, traffic and transportation (Questionnaire administered to residents (2003), Question 6 (3))

Response	%
I recognize the value	72.0%
I do not recognize the value	10.0%
Neither	15.0%
No answer	3.0%
Total	100.0%

Table 3 Evaluation of emergency wharf of the Yodo River and emergency transportation, and awareness that the emergency wharf is already provided (Questionnaire administered to residents (2003), Question 6 (1))

Response	%
I know it	13.0%
I did not know it	68.0%
I want to know details	16.0%
No answer	3.0%
Total	100.0%

b) Hearing from municipalities (2003)

From the results of a hearing from municipalities along the river, the ship transport is expected to improve regional development (Table 4), but willingness for utilization of facilities for activation of regional industries is low (Table 5), and opposing exists on the emergence of effects of extensive cooperation among cities (presence or absence of advantages). Therefore, municipalities seem skeptical (Table 6).

Although the attractiveness of ship transport is apparent, municipalities are hesitant to embark voluntarily on ship transport because financial circumstances are strained now. It is considered that they are seeking cooperation with the national government and the shipping industry.

Table 4 Recognition that ship transport can improve regional development (n = 12)
(Public hearing from municipalities (2003), 3-1)

Response	Answer	%
It is possible	9	75.0%
It is not possible	3	25.0%
Total	12	100.0%

Table 5 Willingness to utilize ship transport for regional industrial activation (n = 12)
(Public hearing from municipalities (2003), 3-2)

Response	Answer	%
I want to use it	4	33.3%
I do not want to use it	6	50.0%
No answer	2	16.7%
Total	12	100.0%

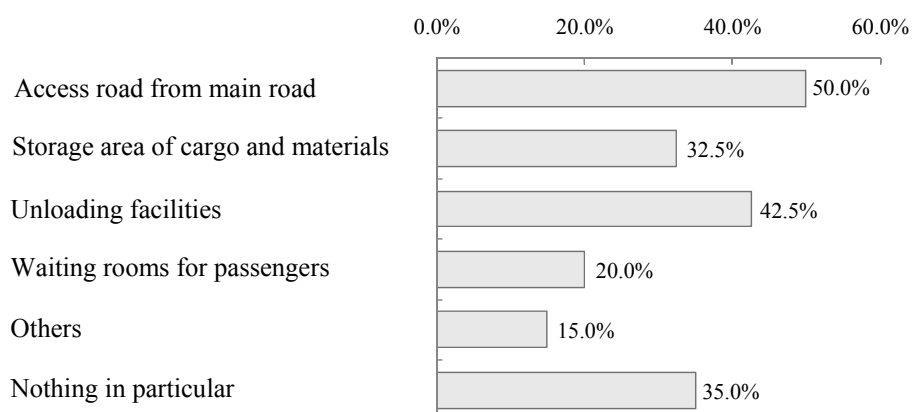
Table 6 Advantages of Yodo River ship transport for extensive cooperation among cities (n = 12)
(Public hearing from municipalities (2003), 4-1)

Response	Answer	%
There is advantage	5	41.7%
There is no advantage	5	41.7%
No answer	2	16.7%
Total	12	100.0%

c) Questionnaire administered to the shipping agents (2002)

As facilities to be provided to emergency wharfs (Figure 3), shipping agents cited road access, unloading facilities, and waiting rooms. However, according to the willingness to use emergency wharfs (Table 7), fewer than 30% of respondents consider using them, even after these are provided, which reveals that half of them hesitate to make judgments about utilizing them at present.

Even though direct access from Osaka Bay to the Yodo River upstream would become possible after installation of locks at the Yodo River great weir, 40% do not think of establishing businesses and more than half have no opinion (Table 8) although demands exist for the installation. In the present economic deterioration as typically represented by the fact that respondents have no ships to use and can not afford to invest (Figure 4), judgments to establish a business solely by shipping agents are difficult from a commercial profit perspective.



Response	Number of times cited	%
Access road from main road	20	50.0%
Storage area of cargo and materials	13	32.5%
Unloading facilities	17	42.5%
Waiting rooms for passengers	8	20.0%
Others	6	15.0%
Nothing in particular	14	35.0%
Total (Number of votes)	78	
Total of valid responses	40	100.0%
No answer	25	
Total	65	

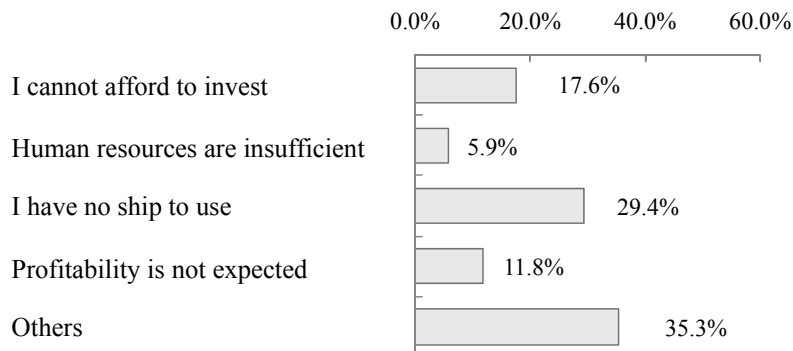
Figure 3 Facilities provided for emergency wharfs (Multiple answers, n = 40)
(Questionnaire administered to the shipping agents (2002), Question 19)

Table 7 Willingness to use when facilities in Question 19 (Table 8) are provided (n = 41)
(Questionnaire administered to the shipping agents (2002), Question 20)

Response	Number of times cited	%
I want to use it	11	26.8%
I do not want to use it	9	22.0%
No opinion/difficult to answer	21	51.2%
Total	41	100.0%
No answer	24	
Total	65	

Table 8 Willingness to establish a business after installation of locks is realized at the Yodo River great weir (n = 46)
(Questionnaire administered to the shipping agents (2002), Question 21)

Response	Number of times cited	%
I want to establish	6	13.0%
I do not want to establish	18	39.1%
No opinion/difficult to answer	22	47.8%
Total	46	100.0%
No answer	19	
Total	65	



Response	Number of times cited	%
I cannot afford to invest	3	17.6%
Human resources are insufficient	1	5.9%
I have no ship to use	5	29.4%
Profitability is not expected	2	11.8%
Others	6	35.3%
Total (Number of votes)	17	
Total of valid responses	17	100.0%
No answer	1	
Total	18	

Figure 4 Reasons for not wishing to establish a business even after installation of locks at the Yodo River great weir (Multiple answers, n = 18)
(Questionnaire administered to the shipping agents (2002), Question 24)

Although it cannot be shown directly, based on the results of hearings from shipping agents held to date, cooperation with facilities operated by the nation or municipalities along the river—acting as a basis of sightseeing—has been demanded, as have been administrative support through public relations activities, and installation of facilities such as public restrooms and waiting rooms. It is considered that businesses are seeking cooperation with public administrative entities (the nation or municipalities along the river).

3. Concrete Measures for Activation of Ship Transport

For the improvement of ship transport activation, to date we have devoted attention to the promotion of utilization during normal times. Recently, with the Great Eastern Japan Earthquake, and the anticipated occurrence of the Tokai, Tonankai, and Nankai earthquakes, now is the time to tackle it from the viewpoints of the aggressive utilization during emergencies while the nation and municipalities along rivers, and eventually the entire nation, act in an integrated manner based on these people's understanding.

For the nation responsible for the management of ship transport facilities, hardware support with installation of facilities that are necessary for shipping agents is important, and also so it is to promote software aspects for support promptly and accurately, such as the provision of navigation route charts, the flexible application of ship transport facilities, and aggressive appeals by holding events *etc.* For municipalities which remain passive about utilization of ship transport considering that it can improve regional development, momentum can be gathered for appealing to residents along the river and for promotion of support measures required for shipping agents if they share the target that active involvement in ship transport during normal times might engender its smooth utilization during emergencies.

As seen from the above we propose the following concrete measures for activation of ship transport³⁾ considering viewpoints of emergency use as well as normal times.

3.1 Measures from viewpoints of normal circumstances

Although residents along the river have needs, shipping agents must continue as a business, and also municipalities must connect it to regional activation. For these reasons, concrete measures for activation of utilization during normal times are presented below.

a) Regional activation for ship transport by municipalities along the river, consciousness improvement of cooperation of watershed cities, and further promotion of cooperation between the public and private sectors should be promoted. Sightseeing ship transport taking advantage of the history and culture of the Yodo River are planned by which improvement of civil needs can be most expected.

Examples:

- Attractive events using land-based facilities (municipalities along the river) to highlight the history of the Yodo River (Kema locks, *etc.*) and nature (wando-biotopes, *etc.*)
- Events for improvement of customer satisfaction from Kema to Hirakata, where the landscape becomes monotonous (slide shows and lectures by a narrator to instruct people on the Yodo River history).

b) Although it is important to secure revenues and expenditures of business of civil business institutions, it is hard to improve the present situation since willingness to use facilities remain low. Therefore, the hardware measures should be administrated through adequate infrastructure provision by the nation and municipalities along the river for the improvement of various needs. Furthermore, the same should be the software provision such as support for flexible operation of the facility and public relations activities.

Examples:

- Provision of public restrooms and waiting rooms at emergency wharfs attending to the needs of the users.
- Development of wharfs and effective utilization of the Hirakata wharf which enable to avoid unavailable time of the Kema locks.
- Extension of available time at the Kema locks for weekends, public holidays and the night time: the locks are available 8:30am – 17:00pm on weekdays at present. Simplification of passing procedures.

c) Investigation of information presentation methods that contribute to safe and smooth navigation for the shipping agents should be performed.

Examples:

- Early provision of navigation route charts and ship navigation rules.
- Construction of information presentation systems through the combination of prior information and

real-time information (river bed transitory condition after flooding, *etc.*) of navigation route charts using the internet and other means.

3.2 Measures from viewpoints of emergencies

Shocked by the tragic results of the Great Eastern Japan Earthquake, public consciousness of crisis management has been increasing. At present, improvement of needs related to utilization of ship transport during and after disaster occurrence is expected more than ever.

It can become motivation to the improvement of needs to encourage interest of people by actively publicizing the roles to be played during emergencies as well as sightseeing activities of ship transport during normal times, promoting earthquake-resistance measures of emergency facilities used during and after wide-scale disasters. Concrete measures are described below.

a) Hold events incorporating opportunities to ascertain the roles of ship-transport-related facilities and river terrace parks to be developed in the event of a wide-scale disaster.

Examples:

- Experience events of the transportation utilizing the facilities such as navigation route, emergency wharfs, emergency river terrace roads so as to aware the effectiveness of alternative transportation for lifesaving and critical materials in a wide scale disaster.
- Training events for residents along the river to set up the evacuation area at the river terrace park, in addition to learn the place and the function of the park set as the regional evacuation site.

b) Promote the provision of a management plan sheet for utilization of ship-transport-related facilities. Make their presence known to related institutions and establish a cooperative framework. In these measures, develop and share momentum for ship transport activation during normal times, which are regarded as supporting the smooth utilization during emergencies.

Examples:

- Advancing the provision of rules for ship transport utilization by municipalities in wide scale disaster.
- Promoting information share such as; emergency river terrace roads (construction and standards, approaching positions, and route restrictions); emergency wharfs (construction and navigable ship standards); and navigation routes (positions and depth) *etc.* so as to act effectively with the cooperation by agreement among building industry, consultants association, gravel gathering union.

4. Conclusions

Recent development of ship transport facilities has been performed for utilization during and after wide-scale disaster occurrence. The active utilization in normal times might be regarded as training for the former, and might foster efficient and effective maintenance, and might be connected directly to the smooth utilization during and after a wide-scale disaster. Based on these perspectives, activation of ship transport in the future is expected to be undertaken recognizing that actions to be taken during normal times and during emergencies are linked inextricably and should not be considered separately.

In this study, using needs related to ship transport as the subject, themes for its activation are assessed using existing survey data. Some concrete measures are proposed. The authors intend to investigate future community renovation considering how waterfront development should be performed for urban rivers, particularly using various functions of rivers and waterfronts while bringing both utilization during normal times and emergencies into perspective.

Finally, the authors wish to express their heartfelt thanks to the Yodo River Office, Kinki Regional Development Bureau who presented us valuable survey data.

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