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A Study on Architectural Facility and Spatial characteristics of Busan Port International Passenger Terminal

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Abstract : *As the international society becomes more and more open, the international marine transportation demand is growing. And the growth of international tour demands and the developments of new passenger ship routes make the role of passenger terminals crucial. In this context this study analyzes and compares the terminals of Korea and Japan and defines design criteria for the construction of a passenger terminal. As a result of this study, it is proposed that an urban context, an architectural type and spatial characteristics be taken into account for the construction of a passenger terminal. The ultimate purpose of this study is to build a future-oriented international passenger terminal based on the result of this study, which will lead the ocean culture.*

Key words : *International passenger terminal, Busan, Architectural facility, Spatial characteristics, Program, Institution, Ocean tour*

1. Introduction

Korea is located on a peninsular connecting Northeast Asia and the Pacific. For this reason Korea has historically been a transportational hub for its surrounding nations. As the international society is more open than ever, the amount of international passengers and cargo has rapidly increased among Korea, China, Russia and Japan. As a result, the ports in Korea, with their exiting capacity, cannot handle the ever-increasing passengers and cargo any more necessitating the expansion of their facilities.

Especially as the number of international tourists using marine routes has been growing and new passenger ship routes have been developed, the importance of International Passenger Terminal has been surfaced. Contrary to this trend, however, the old and small existing terminals are causing inconveniences to tourists. Even the few newly-built terminals and renovations are not enough. Even though a terminal is for passengers, with the growing tourists by way of marine routes the simple expansion of terminals does not meet the needs of customers.

Within this context, the primary purpose of this study is to elicit a variety of design criteria from an urban context to detailed spaces of a terminal building, which is required for the construction of international passenger terminals. I chose a couple of international passenger terminals of Korea and Japan centering on Busan Port as the object of this study because they have a long operation history, therefore lots of accumulated data, a huge number of passengers and relatively advanced facilities. Busan Port International Passenger Terminal has the largest number of passengers among terminals in Korea, Japan and China, therefore it is the best object to elicit design criteria for this study. The secondary purpose of this study is to figure out existing problems of Busan Port International Passenger Terminal and propose ways to improve its setting a partial model for international passenger terminals and further more enabling the construction of an international passenger terminal leading a future-oriented ocean culture.

2. An Outline of IPT in Korea-Japan Route

2.1 International Passenger Terminal in Korea

Though it is well known that Korea is a hub of international transportation, since the 1990s the number of marine passengers has markedly increased for the growing tourism demand of Korea has concentrated on nearby nations such as China, Japan and Russia. In 1994, the number of coastal passengers was only 400,000, but it jumped to 1,700,000 in 10 years. With newly developed passenger ship routes, Korea has a total of 20 lines operating, 13 to China, 6 to Japan, and 1 to Russia as shown in Fig. 1. For this, terminals for Korea-China, Korea-Japan and Korea-Russia lines were constructed at the major ports of the West, the South and the East sea, and as of February, 2005, there are 8 terminals as Table 1 shows.

Since its opening in 1978 Busan Port International Passenger Terminal has been connecting Busan and

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Tsushima, Hakata, Kokurai, Shimonoseki, Hiroshima and Osaka. With its passengers over 1 million in 2004 Busan Port International Passenger Terminal achieved the highest performance among all the terminals of the three nations. Currently short-term renovations are underway, but world-class facilities are urgently required for this terminal as the gateway of international transportation and center of ocean tour. Incheon Port International Passenger Terminal operates 10 lines between Korea and China (Dandong, Dailan, Yingkou, Qinghuandao, Tianjin, Yantai, Weihai, Seokdo, Qingdao, Lianyungang) with its Terminal 1 and Terminal 2 built in 2000 and 2002, respectively and shows a rapid growth. But the two terminals are apart from each other causing inconvenience.

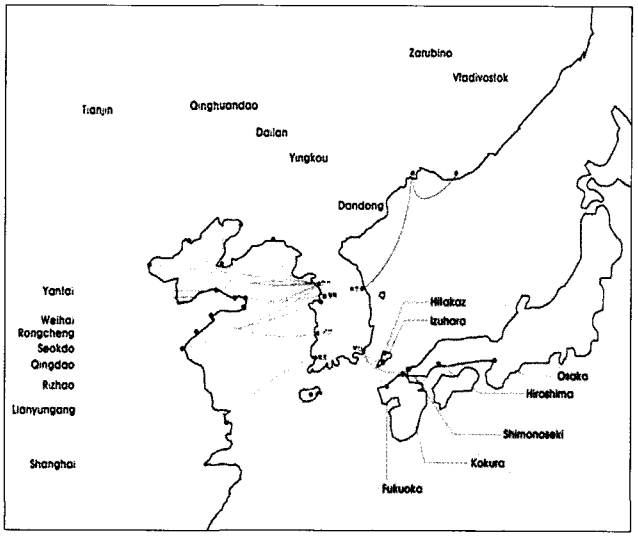


Fig. 1 International Passenger Ship Route of Korea, 2004

Pyeoungtaek Port International Passenger Terminal constructed in 2001 with its new port runs two lines connecting Rizhao and Rongcheng. Gunsan Port International Passenger Terminal was completed in December, 2004 and began to operate the line to Qingdao, China. The newly built building resolved the inconvenience of taking a bus after the departure process. Mokpo Port Terminal and Jeju Port Terminal are under construction and to be completed in 2005 and 2006, respectively. Sokcho Port International Passenger Terminal began to operate the 'Mt. Baekdusan Route' connecting Zarubino of Russia and Hunchun of China in April, 2000 and the line was extended to Vladivostok Port of Russia.

The above mentioned eight terminals have been renovated or newly built since 2000, which was part of preparation for the World Cup Games and the Busan Asian Games. The renovation or new construction of the terminals also reflects the expansion of international trade.

Table 1 List of International Passenger Terminal in Korea

	completion renovation	site area m²	bldg. gross m²	floor ratio %	car park m²	floor	route	2004 passenger
Busan	1978 2002	86,833	11,589	13	5,200	4	J-6	1,027,000
Incheon-1	2000	21,180	18,393	88	5,421	4	C-6	50,0000
Incheon-2	1988 2002	23,233	10,138	44	3,372	2	C-4	
Pyeoungtaek	2001	25,000	4,991	20	-	2	C-2	171,000
Gunsan	1996 2004	38,639	7,167	19	5,840	2	C-1	-
Mokpo	1998	22,958	6,607	29	-	3	C-1	-
Jeju	1989 2004	2,660	2,660	100	-	1	-	-
Sokcho	2000	8,854	5,200	59	-	1	R-1	47,000
						total passenger		1,745,000

1. J=Japan, C=China, R=Russia
2. Incheon Port passenger=presumed. (up to Nov., 440,000)
3. Sokcho Port passenger=statistic of the year 2003.

2.2 International Passenger Terminal in Japan

Japan has a long history of marine transportation. Countless ships such as Domestic Liners, International Liners, Sightseeing boats, Restaurant ships, Cruise ships, Long distance ferries and Roofing ships cross the sea around Japan along the numerous marine routes. But Japan operates only 12 international passenger lines, less than Korea's, 1 line to Sakhalin, 6 to Busan, 2 to Shanghai, 1 to Tianjin, 1 to Qingdao and 1 to Taiwan. With 6 lines to Busan out of 12, Busan takes the most important position in Japan's international passenger ship business.

Table 2 List of International Passenger Terminal in Japan

	completion renovation	site area m²	bldg. gross m²	floor ratio %	car park (bus)	floor	route	2004 passenger
Hakata	1993	11,230	13,280	118	97(6)	4	1	657,128
Shimonoseki	1988	6,800	10,400	65	65(6)	3	2	155,977
Osaka	1994 2003	5,700	4,380	76	28(2)	3	2	90,167
Kobe	1970 1983	12,000	14,080	117	300(16)	3	-	(100,000)
Izuhara Hitakaz	used as both coastal and international					2	1	43,360
Kokurai	about 7 minutes to Kokura station					2	1	34,116
Hiroshima	used as both departure & arrival CIQ					2	1	24,653
						total passenger		1,005,401

1. passenger is only Korea-Japan Route.
2. The Number in ( ) is statistic of the year 2003.

As Table 2 shows, there are 7 passenger terminals for the Korea-Japan lines. Among these Hakata, Shimonoseki and Osaka Port are suitable for the comparison with Busan Port Terminal based on their history, scale, and passenger volume.

Hakata Port International Terminal, located at the biggest port of Kyushu, has the largest number of passengers in Japan. It takes 2 hours and 50 minutes from Hakata to

Busan. Shimonoseki Port International Terminal, the gateway of Honshu, launched the first passenger ship to foreign nations in 1905 giving itself a 100-year history. The line from Osaka to Busan is the longest route and Osaka Port International Terminal has a Korean-only path.

Izuhara and Hitakaz terminals are located in the south and the north of Tsushima, respectively, and they handle both coastal and international passengers. Kokurai International Terminal operates express ships and is located in Kitakyushu City renowned as the center of domestic logistics. Hiroshima Port International Terminal is a Korean-only terminal located in the middle of a pier under construction. Kobe Port International Terminal has not yet run lines to Korea and China, but makes a good comparison with Busan Port.

3. Some Urban Factor of Busan Port IPT

In analyzing Busan Port Passenger Terminal, there are several key points in an urban context. The following three points are not the general ones to be considered in an urban context but the essential ones for understanding the characteristics of Busan Terminal architecture.

Fig. 2 Urban Perspective of Busan Port IPT

3.1 Transportation System

The convenience of a terminal depends on its transportation system connecting to the public transportation. As most terminals are located at ports, a transportation system connecting the logistics center of the port and the infrastructure of the city is very important. But in many cases the transportation system is not that efficient. For instance, it is difficult for people to walk from the urban center to Hakata Port International Terminal. A bus from Kohukumachi subway takes 10 minutes and from Hakata station 20 minutes. There are no buses even to Osaka Port International Terminal, so people have to walk from the Cosmosquare for over 20 minutes. It takes 7 minutes on foot, relatively short, from Shimonoseki Station to Shimonoseki Port International Terminal.

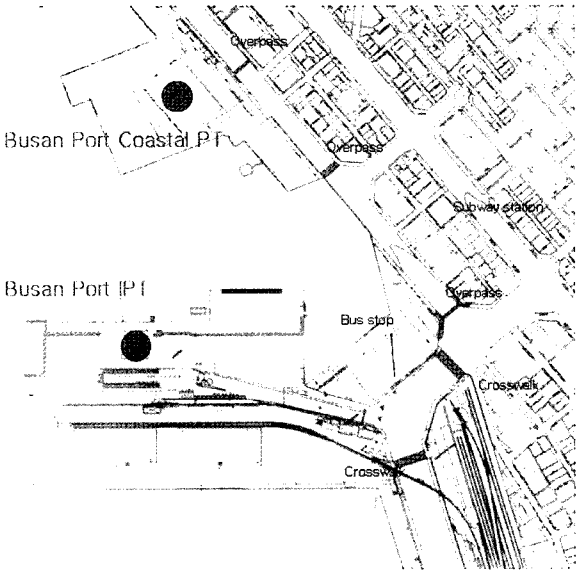


Fig. 3 Pedestrian access system of Busan Port IPT

Busan Port International Terminal is accessible from the subway, the bus stop and the Coastal Passenger Terminal and it takes 10 minutes by walking(Fig. 5). But from the subway they have to cross an overpass and the sidewalk from the Coastal Passenger Terminal is narrow and embossed making it hard to drag baggage. The bus stop is outside the terminal boundary and has no canopy for rains and the buses don't go to the urban center. Consequently, even though there is a public transportation connecting the terminal and the urban center, conveniences for pedestrians are not enough and it is not efficient because of the unreasonable location. The terminal needs a passenger-friendly transportation system including sidewalks for pedestrians and the disabled, buses to the terminal and bus stops with a canopy.

3.2 Tourism Network

The passengers of a international terminals are tourists to boost consumption, therefore terminals are an important resource for the tourism network. In terms of urban planning a passenger terminal is a means to develop a port. Beside Hakata Port International Terminal there are the Marine Messe Fukuoka, an Exhibition Park, the International Congress Center, Fukuoka Sun Palace and

Fukuoka International Center(Fig. 4). Across the pier there is Naka River Promenade including Hakata Port Tower. The Sea Mall Shopping Center and the Kaikyo Yume Tower are located next to Shimonoseki Port International Terminal(Fig. 5). And these facilities are mutually complementary, located closely and visually connected producing a synergy effect. Osaka Port International Ferry Terminal is located near the Osaka Maritime Museum and the Wine Museum Osaka. But it has not been fully vitalized due to the small flow of population. The reason for this is that the Technoport Osaka Project to develope Cosmosquare district has not been completed yet. The Technoport Osaka Project is a development plan to revitalize the economy and industries of Kansai by connecting the artificial islands such as Sakishima, Maishima and Yumeshima with the Tempozan of the shore through a transportation network.

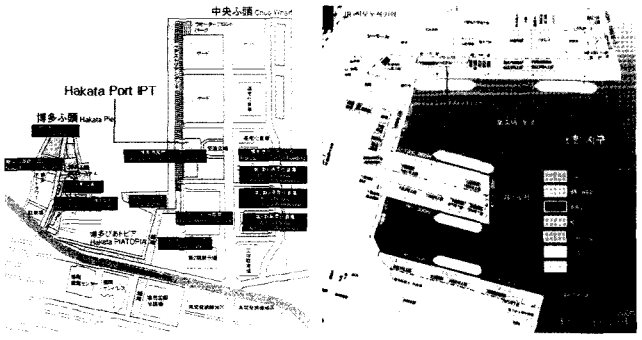


Fig. 4(L) Hakata Piatopia of Hakata Port IPT
Fig. 5(R) Urban Context of Shimonoseki Port IPT

Next to the International Passenger Terminal of Busan North Port there is the Coastal Passenger Terminal and across the Youngo Bridge at the South Port there is the Jagalchi Market, the largest fish market in Korea(Fig. 6). Besides, the PIFF (Pusan International Film Festival) Plaza, an internationally well-known tourist attraction, and the KTX Busan Station, the destination of the Korean high-speed train are within a 2 km-radius from the terminal. This transportation network and nearby tourist places made Busan Port a commercial district and international tourist attraction as well. On the contrary the North Port Terminal has no tourism network and separated from the South Port, therefore, it can not share any facilities with the South Port. This makes the North Port unable to take advantage of the merits of its surroundings. Further more, it is hard to find its location even from the main access road making people confuse the Coastal Terminal with the International Terminal. As a result, it is urgently needed to make a plan to expand the number of passengers and to make the terminal visually recognizable through a systematic tourism network.

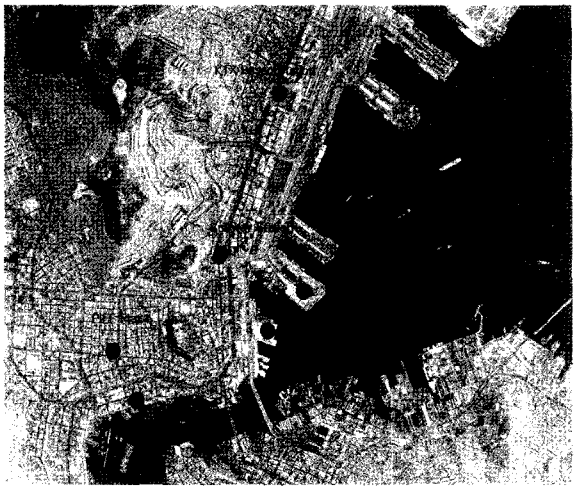
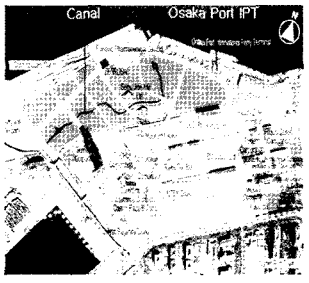


Fig. 6 Urban Context of Busan Port IPT

3.3 Waterfront Development

A passenger terminal is a core facility of a waterfront development. In Japan most waterfronts have been developed with a focus on passenger terminals. By connecting Hakata Pier and the International Terminal, Hakata Port makes an open space leading to the Event Berth, the Bayside Place, the Central Square and the Sunset Park. It also makes Hakata Piatopia a pedestrians' heaven by opening all the seaside area(Fig. 4). Sakishima Canal and the Seaside Cosmo bridging Osaka Port International Ferry Terminal and Artgrace Wedding Coast are the best waterfront of Sakishima, which well coordinates humans, water and a green area(Fig. 7). This water-familiar environment makes an urban renewal possible. Though it has no Korea-Japan lines, Kobe Port near Osaka Port has a well-developed waterfront. Especially the area connecting the Harborland of the Takahama Quay and the Meriken Park of the Naka Pier is an open space, a water-familiar theme park composed of a subway station, a terminal, ferries, cruises, hotels, restaurants, shopping malls, an amusement park and museums(Fig. 8).



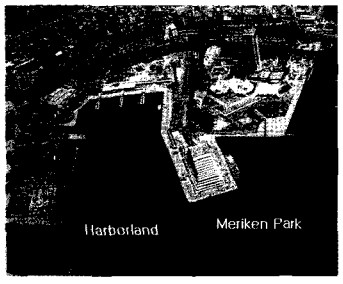


Fig. 7(L) Urban Context of Osaka Port IPT
Fig. 8(R) Harborland & Meriken Park of Kobe Port IPT

Busan Port International Passenger Terminal has beautiful tourism resources but has no well-developed water-familiar

areas. As a result, the terminal environment is dry and does not help the revitalization of the city. A future new terminal construction should include a waterfront development plan and a future-oriented water- familiar area.

4. Typology of IPT Architecture

4.1 Definition of Facility as a Building Type

An international passenger terminal is a port facility using ships and piers and a transportation facility delivering passengers and cargo. It is also a international Facility for the Immigration Control and a multiple-use facility used by a lot of people. It is a tourism resource that plays a key role in waterfront development. It is an architectural type that can perform properly when it meets all these conditions. Therefore, a terminal, as a building type, has characteristics in a range from its land use to a detailed space plan. Let me see the elements which determine the relationship between the site and the building and the volume of the building.

4.2 Site Planning

In building designs the priority is to make a land use plan that determines the inseparable elements such as a building orientation, a vehicle circulation system, pedestrian moving lines and open spaces. But a terminal as an architectural type has some different conditions. As a terminal is located on the threshold of the land and the sea, and it has a square in the front and a pier in the back, and both the two sides of the building should be considered. In other words, a terminal should respond to ships and an apron to the seaside and vehicles and curbside to the land-side.

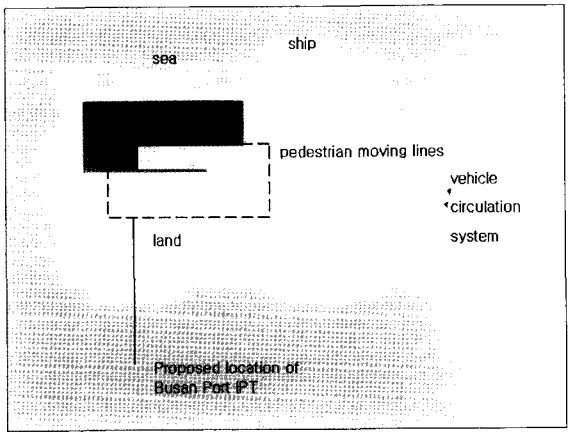


Fig. 9 Land Use Diagram of Busan Port IPT

Passengers get off from ships at different plane points every time and due to many different sizes and kinds of ships, the level of off-boarding is always different. If roughly categorizing, first, passengers get off directly to the pier and second, through a boarding gangway as high as a two-story building. On top of this on an apron adjacent to ships forklift trucks and cars move at the same time when passengers go on board or go ashore. Unlike ordinary building designs a terminal design requires to consider sea-related conditions like these.

In the case of Busan Port Terminal, ships are supposed to come alongside the pier far from the terminal and buses take passengers from the off-board points to the terminal. This causes inconvenience to passengers. In the case of Kobe Terminal, however, the building is placed in the same shape of the pier. Therefore, the distance from all ships coming to the pier to the building is always the same leading passengers conveniently to the building. Considering the number of passengers of Busan Port Terminal, the terminal building should be made in the same shape of the pier like Kobe Port.

The land-side of a terminal is not significantly different from any ordinary large buildings. Vehicles to the terminal should circulate and turn back smoothly on the front square and passengers go to the pier through the building. This is like an airport terminal located between the front parking lot and the runway. Therefore the placement of buildings depends on the entering vehicle way and the shape of the pier. The front of Busan Port Terminal is used as a parking lot and there is no platforms for cars making difficult for tour buses to turn around. This causes the congestion of waiting vehicles.

As a port terminal can have a fine view of the sea thanks to its location, it should be designed to take advantage of the beauty of the sea. The waterfront around a terminal can provide a attractive place if people can access there. For now people can not see the sea from neither the front square nor inside the terminal. In the cases of Hakata and Osaka Terminal, the surroundings of the terminals are open to the sea providing beautiful views and people can see the panorama of the sea from the inside of Shimonoseki and Kobe Terminal.

4.3 Definition of Volume

The volume of a terminal as an architectural type depends on the maximum number of passengers that it can handle for a certain period of time. The 'maximum number of passengers processed at a time' relies on the arrival and departure schedule of ships, the capacity of ships and the boarding rate of peak seasons. So it is very difficult to determine the number that is changeable depending on the future number of passengers.

Once the maximum number is defined based on many

conditions, the time to process the passengers should be calculated. The process time is the time to pass through the CIQ, which depends on the time for one passenger and the number of check counters and the time for one passenger depends on the baggage volume of the person. The time for the maximum number of passenger processed at a time to pass through the CIQ is determined for the Immigration Control, the Security Inspection and the Customs, respectively. Based on the time difference between each process the number of waiting passengers can be counted and the area of the waiting room is the number of waiting passengers multiplied by the area required for one person.

The total area of the three process steps is the total CIQ area. The volume of a terminal is defined by this process and depends on a site study, accumulated data and tolerance values.

Busan Port Terminal was designed for 1,000 ships of 10,000 tons a year and 1,000 passengers a day and for the last 20 years there has been no serious problems in terms of its capacity. Currently, however, 1 million passengers use the terminal yearly and the terminal operates 14 ships without any expansion of the CIQ making urgent its renovation.

5. Spatial Characteristics of IPT

Many kinds of spaces are needed for a terminal, but the total volume of the building is largely dependent on the CIQ area. To make a space program putting together each individual space is not different from ordinary building designs. Table 3 enumerates space units and groups them by characteristics. The space of a port terminal is characterized by three points of view.

Table 3 Spatial and Functional Model

Spatial Characteristics	Area	Space Unit
Successive Activity & Sequential Space Unit	*CIQ Security Inspection Customs Declaration Quarantine Regulations	Departure Arrival
Functional Zoning & Networking	Consumer Services	Telephone Booth Check in Counter Bank Rest Room Resting Place Connection System
	Commercial (Convenience Retail)	Duty & Tax Free Food & Beverage Specialty Retail
	Administration	Security Service
	Office	Operation Company Pier Management -Cooperation
Circulation System	Vehicle Area	Parking Lot Vehicle Way Drop off platform
	Cargo & Baggage	Baggage Handling Boarding Gangway

5.1 Successive Activity & Sequential Space Unit

The massing of ordinary buildings is definitely defined by designers' concept, but that of a terminal by the structure of a CIQ area. A CIQ area, the most important space, is made of Departure and Arrival. As Table 1 shows, each of the two areas accommodates Security Inspection, Customs Declaration and Quarantine Regulations, which are successively processed in a linear direction unlike a circulation system.

Between one step and the next one there is a waiting time making the process a successive activity, but the waiting spaces of the three steps are visually and physically interconnected producing a sequential space. A linear space that places the three units in a strait line is ideal considering the space and activity characteristics.

Another characteristic of the CIQ is that Departure and Arrival are separately operated. Immigration controls for Departure and Arrival are never crossed visually, conceptually and physically.

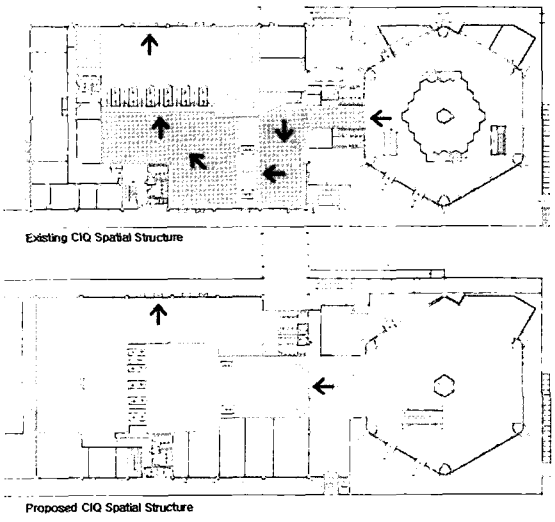


Fig. 10 Spatial Structure of Departure CIQ in Busan Port IPT

Busan Terminal is a 40m x 110m rectangle-shape building and Arrival is on the 1st floor and Departure, the 2nd floor, absolutely separated from each other. But the 40m width can not accommodate the CIQ, so the CIQ is placed along the 110m-length. As a result, the successive activity of the CIQ change its direction four times from the entrance to the exit(Fig. 10, existing). This is very inconvenient for passengers especially when the CIQ is crowded.

To improve the situation the moving line in the CIQ should be made as linear as possible or the width of the space should be expanded(Fig. 10, proposed). The CIQ space and its activity are the core part of a terminal, which determine the shape, volume and orientation of the building.

As shown in Table 4, the sequential flow of the CIQ space is interconnected with the processes of the other spaces such as waiting and approach.

Table 4 Spatial and Functional unit of IPT

phase	subject-activity	space unit	furniture
boarding	passenger Boarding	gangway	
after CIQ	passenger waiting	duty free shop	telephone
		boarding lounge / VIP	
		coffee/retail/toilet	
CIQ	Departure Immigration	standing line	counter
	Security Inspection	standing line	
	Customs Declaration	standing line	
	Quarantine Regulations	standing line	
before CIQ	passenger check in paying the PSC	ticketing counter	E/D card desk
		Passenger Service Charge	
		Military Manpower	
		Cultural Heritage	
		exchange bank	
waiting	passemger waiter meeting questioning	waiting lounge / VIP	telephone pagola/bench
		coffee/retail/toilet	
		shopping mall	
		restaurant/food court	
		meeting place	
		information center	
	cargo unloading	baggage room	loading-deck
approach	passenger drop off	platform	sign board
	pedestrian walking	pedestrian road	
	vehicle parking	parking system	
access	passenger search	Gateway	

5.2 Functional Zoning & Networking

The indoor space of a terminal is zoned as Consumer Services, Commercial, Administration, Office area by functions. In some cases these zones should be closely located to each other and in other cases they have to be separately placed. Sometimes they have to be concentrated in one area and other times dispersed in many parts of the building. Considering these needs a terminal should organically network the whole indoor space as the diagram of Fig. 11 shows.

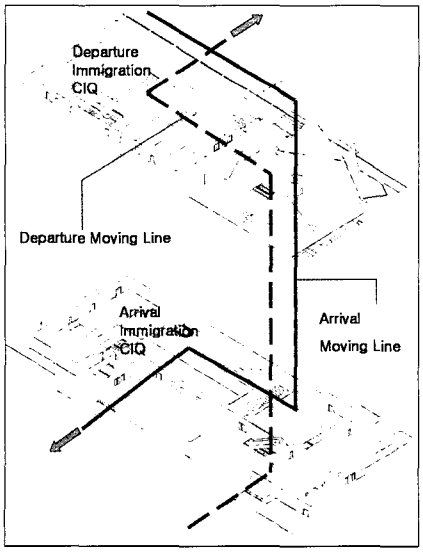


Fig. 11 Spatial Diagram of Busan Port IPT

However, the current Busan Port Terminal lacks Consumer Services and its Commercial is irrationally placed. As shown in Fig. 12, Administration and Office area are mixed with the space for passengers and occupy too much area in the CIQ.

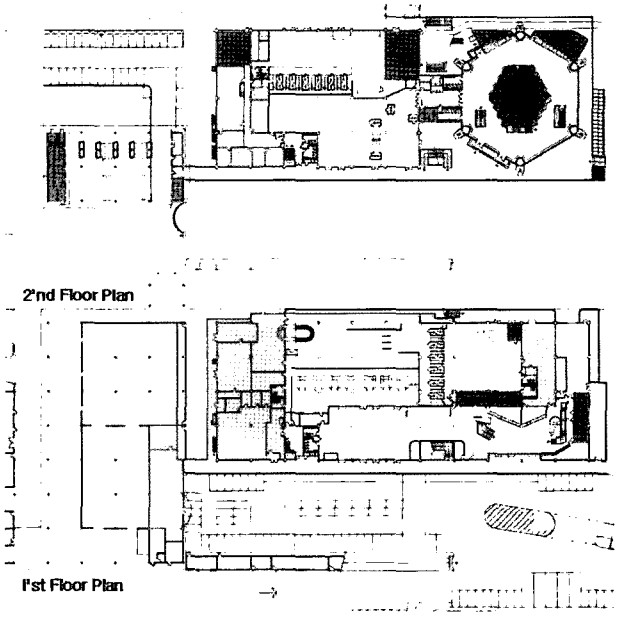


Fig. 12 Existing Service & Office Area of Busan Port IPT

Therefore, Administration and Office area should be concentrated in one space and their other related spaces should be properly placed. For example, Fig. 13 proposes an orderly and concentrated space structure. With this space plan, the interior space of the terminal can be distinctly divided by functions and used efficiently.

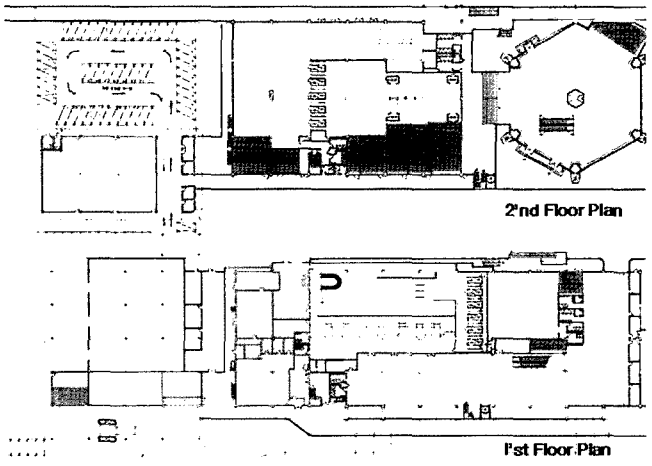


Fig. 13 Proposed Service & Office Area of Busan Port IPT

5.3 Circulation System

The circulation system for vehicles is crucial for a terminal. Like blood vessels of a human body, a congestion

at one spot affects all functions of the whole building, which is a common characteristic of facilities used by many people like a terminal and transportations. Therefore, the vehicle way circulating the front square and leading to the parking lot should be precisely planned. Especially Visitor's parking lot and Staff parking lot should be separately managed.

As an airport needs a curbside, a terminal needs a platfor m for dropping off and picking up in the front. An airport s imply separates vehicles to Departure and Arrival with ram ps, however this is not easy for a terminal because ships a nd their passengers using a terminal is not as many as airp lanes and air passengers using an airport and the terminal building is not large. Besides, it is hard to build ramps on a pier and once they are constructed it is not easy to change them.

Cargo and baggage processing systems should be designed in line with the vehicle circulation system. In the front of a baggage handing area there should be a loading deck so that passengers can load or unload to and from their car.

As Fig. 14 shows, the front land of Busan Port Terminal is used as a parking lot, which makes vehicle circulation difficult, and there is no loading decks in front of the cargo clearance. Therefore it is necessary to introduce a circulation system and to make two separate parking lots for passenger vehicle and cargo vehicle not to make them crossed.

A boarding gangway can be built fixed or dismountable. The most important for a boarding gangway is that it should be made in a way that passengers can drag their baggage smoothly. Especially for the passengers up and down between the 2nd floor and the apron elevators should be built. In addition, a boarding gangway should be as short as possible, because it hurts the beauty of the building when seen from the sea.

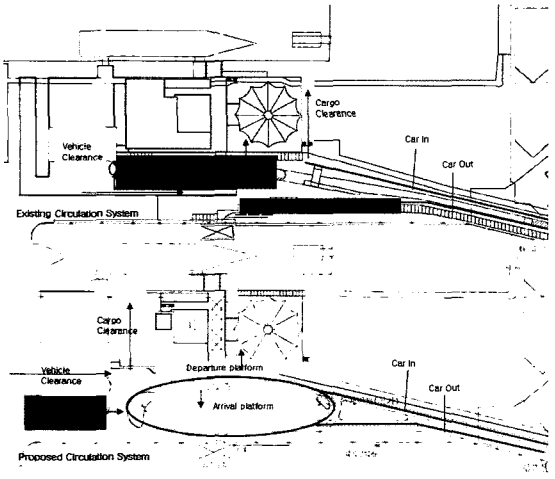


Fig. 14 Circulation System of Busan Port IPT

With too many turns, level differences on the path, lack of air conditioning and heating and the closed seaside view the boarding gangway of Busan Terminal gives passengers inconvenience and hurts the outer feature of the building.

6. Design Elements for The Future-Oriented IPT

6.1 Master plan

It is not simple to define the exact facility capacity of a terminal because it depends on the number of passengers. Of course the number is changeable and once a terminal building is completed its expansion or renovation is very complicated. This is why a future-oriented master plan should be prepared from the initial step of a planning.

A future-oriented master plan simply does not mean to make the enlargement of the total area possible through an expansion or a renovation. It should be enlarged within the existing space structure and allowable renovation range. That is to say the best way is the remodelling of the building at a right time.

Even when remodelling is underway the terminal should keep on operating, therefore it is required to make a master plan including remodelling plans by steps, remodelling methods and a long-term development plan. If there is no preparations or master plans for growing passengers, temporary remedies will disturb the original structure and cause inconvenience for a considerable period of time.

6.2 Terminal Complex for Waterfront

The recent attention focused on marine transportation and ocean tour means the demand for water-familiar area or waterfront development is growing. Therefore a terminal complex should be made in the context of a port development. When developing a water-familiar area, an effect to attract people is crucial. No matter how good a facility is if there is no people it has no meaning.

In this context Busan terminal used by 1 million people yearly is a core of a water-familiar area development. If tourists using the terminal experience inconvenience in a poor environment, the terminal would be a barrier to an ocean tour boom. The terminal itself shows the status of Busan tourism industry.

When developing a water-familiar area at a port, it should be planned as a complex including hotels, shopping malls, game centers, theme parks and a terminal and connecting international and coastal liners and cruise ships. A terminal should not be regarded as only a traditional passenger facility but also a Ocean Entertainment Center.

6.3 Monumentality and Symbolism

Hakata Terminal looks like a telescope and Osaka Terminal boasts its dynamic beauty. The Mosaic of Kobe and the Tokyo decks of Odaiba(Fig. 15) are theme shopping malls built on the top of the buildings like a deck of a ship.

Fig. 15 Tokyo Decks, Odaiba

All these buildings have monumentality and symbolism against the sea as their background. Built on a pier against the sea as its backdrop a port terminal, whether its design is good or bad, is not like ordinary buildings and can accommodate a design of strong impressions.

From the Coastal Passenger Terminal of Yokohama people see nothing but the spacious green park(Fig. 16). But below it the huge indoor space is supported only by a few columns and from there people can see the whole Yokohama Port.

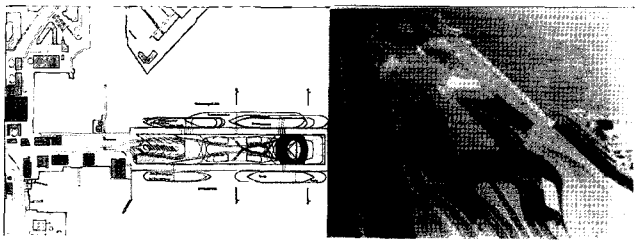


Fig. 16 Yokohama Port Ferry Terminal

A port terminal is a lively facility used by many people and constructed against the sea, unlike the backgrounds of ordinary buildings. It is time to plan a future-oriented terminal by giving every corner of the building a unified image.

7. Conclusion

As examined above, the existing Korea's international passenger terminals should be renovated or newly built to meet the rapidly growing demand for marine transportation and ocean tour. It does not mean a simple expansion but meeting the current needs by setting more systematic and rational criteria. To this aim I analyzed and compared the terminal facilities of Korea-Japan routes and based on this I elicited planning elements reflecting characteristics of those terminals. The following is the briefed result.

1. A terminal should be planned in an urban context including transportation systems, tourism networks and waterfront developments.
2. When planning a port passenger terminal as an architectural type and a core facility for ocean tour, the sea and the land should be considered at the same time and its facility capacity is defined by the number of passengers 3. Characteristics of a terminal are determined by its unique arrival and departure systems. A terminal space, a network of diverse facilities, needs a circulation system without congestions.

Design criteria based on the above were applied to Busan Port Passenger Terminal. It turns out that with over 1 million passengers Busan Terminal, a typical facility of Asia, has a great potential for development. If the dynamic environment of Busan Port is fully utilized, if architectural design elements suitable for the features of the roads and the pier are used, and if the spatial successivity and networking is introduced, a world-class marine transportation facility can be born. In addition, to make a future-oriented terminal a master plan, a terminal complex, monumentality and symbolism should also be introduced. Busan Port with the Passenger Terminal will be a new base leading northeast Asia's ocean culture.

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