INTERNATIONAL SHIPPING AS A FACTOR OF LOGISTICS NETWORK IN ASIA

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Abstract

Shipping is one of the most important factors in Asia logistics. It is because there are several peninsulas and many archipelagos in Asia. Since AFTA accelerated international trade among Asian countries, transportation such as road, rail and sea has been required more important roles. Thus seamless combination of different transportation modes including shipping is necessary to develop the international trade and economy in Asia. It is essential to adjust not only shipping but also container terminal facility as the port infrastructure. This paper, therefore, considered shipping and container terminal are the essential factors as well as the other transportation modes for sustainable development of the trade and economy in Asia. Also, the recent logistics trends caused by rapid Asian economic expansion were identified.

Key Words: AFTA, Intra Asia trade, seamless logistics, logistics infrastructure

1 Introduction

Because of the geographical configuration of Asia (archipelagos, peninsulas and small group of islands), its trade relies more on shipping as compared with other regions. This indicates one of the characteristics of Asia region's trade; shipping is a significant factor of logistics in Asia. Henceforth, discussing logistics in the context of Asia is without basis if shipping is not included. Since the international shipping is one of the most important factors of Asian logistics, and as such this study will focus on the shipping. In this study, international shipping refers to both liner shipping and container trade.

As the conclusion of FTA in Asia, the negotiation is carried out actively upon. The Asian integration, that is ASEAN+3, began to move toward realization. Asia got out of the Asia Monetary Crisis (1997) and began to show strong economic growth once again.
Now Asia became the center of container trade in the world. Increasing international horizontal specialization among the Asian countries has increased intra-Asia container trade dramatically. It is expected that Asian trade will still increase more with the form that the liberalization of the trade by FTA backs up.

There were incidents that would afford a lesson to Asia. The big confusion was observed in 2004 at U.S. West coast and some European ports which were not able to correspond to the rapid increase of the container cargo from China and other Asian countries. There are the reasons in infrastructure; Insufficient terminal facilities, lack of labors at the port terminals and capacity problem of inland transportation. Over 8000TEU container ship just started to be serviced in succession this year (2006). The insufficient capacity of container terminals is not able to deny the possibility of the congestion of the ports mentioned above, without any drastic solutions.

It is not guaranteed that the terminal congestion does not break out in any Asian ports, either. In addition, the inland transport equipments such as trucks and freight train are not enough to support inland transportation. Moreover there is another problem that the cargo movement across the borders is also not smooth. The sufficient logistics infrastructure, not only ports terminals but also inland infrastructure, is

important for the sustainable development of Asia economics. In this point of view, the divergence of logistics infrastructure among Asian countries is one of considerable issues.

This study aims at identifying the changes in Asian logistics, particularly container trade, and how the specific region has gradually become a logistics center for world trade. Finally, the considerable problems that hinder sustainable development and growth of Asian trade and economy were discussed.

2. The changes in international shipping as an important factor of logistics network in Asia

2.1 World container trade

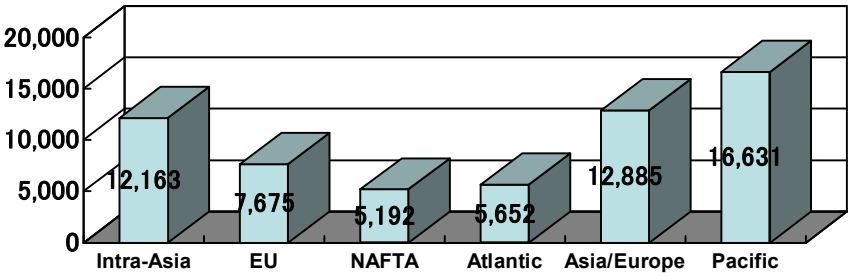
Container trade of 2004 is 82,689,000 TEU in total. The biggest portion of the trade is the transpacific with the quantity of 16,631,000 TEU. The second one is Europe/Asia trade with the quantity of 12,885,000 TEU. Intra-Asia trade follows then with 12,163,000 TEU. Asia is concerned with all the three major trades. In other words, Asia-related trades occupy 50.4% shares of total container trade in the world. In addition, trying to compare with intra trades such as Europe or North and South America, intra trades go to 12,163,000 TEU, 7,675,000 TEU and 5,192,000 TEU respectively. Intra-Asia trade has overwhelming volumes than other areas. Thus, it can be said that Asia is the center of container trade.

Table 1 World Container Trade (2004) Unit: TEU

from/to	N.America	E.Asia	Europe	S.America	M.East	India Etc	Africa	Oceania	Total
N.America	339	5,027	2,249	1,834	160	216	189	252	**10,266**
E.Asia	11,604	12,163	8,450	850	1,300	1,120	975	800	**37,261**
Europe	3,403	4,435	7,675	950	1,675	600	1,487	400	**20,625**
S.America	2,119	1,100	1,500	900	106	20	121	22	**5,888**
M.East	287	300	525	3	200	50	46	11	**1,422**
India Etc.	533	850	910	45	450	130	103	23	**3,044**
Africa	149	825	770	51	65	125	435	32	**2,452**
Oceania	203	785	150	39	66	41	27	420	**1,731**
Total	**18,636**	**25,485**	**22,229**	**4,673**	**4,022**	**2,302**	**3,383**	**1,960**	**82,689**

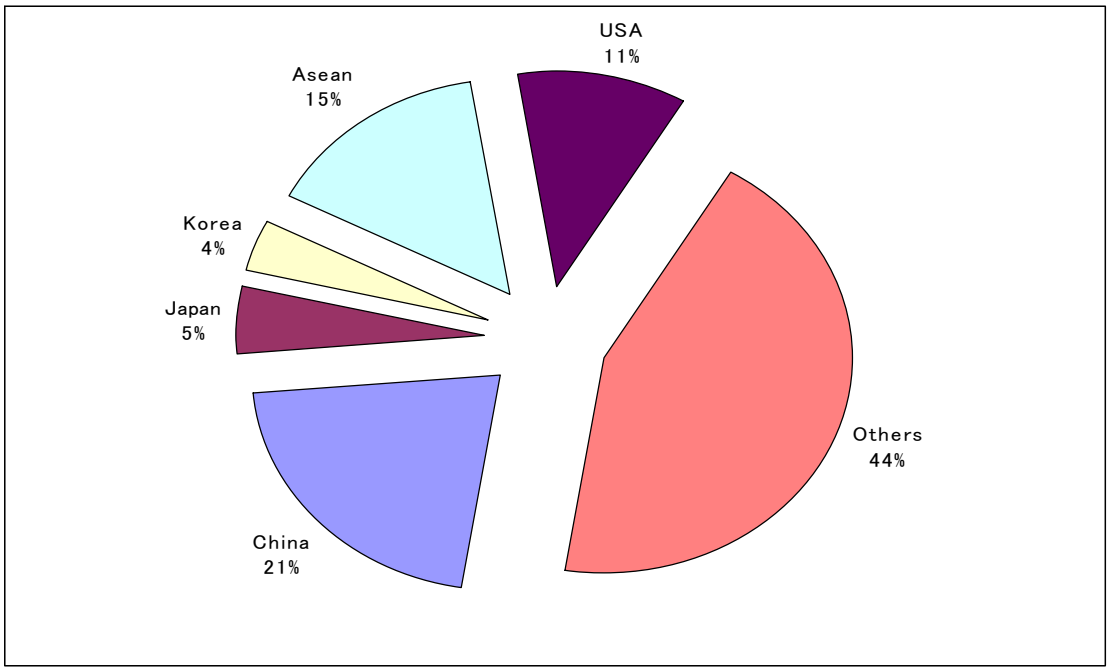
Data: “Container Shipping Report 2004/2005” Mitsui O.S.K. Lines

China (including Hong Kong) has 21% of container handling volumes, while Japan 5%, Korea 4% and ASEAN countries 15%. That means ASEAN, China, Japan and Korea (i.e. ASEAN+3) handle almost half of world containers. In addition, many Asian ports rank the top of the world container port. Singapore stands the first with container handling volumes. The second is Hong Kong and the third is Shanghai, then following Shenzhen, Pusan, Kaohsiung in 2005. Defining Middle East ports as Asian, the world top 20 ports get into Asian ports. It is obvious that Asian ports play important roles in container handling volumes as well as the world container trade.



Unit: 1,000 TEU * Intra-Asia=East Asian Countries
Data: "Container Shipping Report (2004/2005)" Mitsui O.S.K. Lines

Figure 1 Container Trade Area/Lines (2004))



Data: "Containerisation International Year Book"

Figure 2 Container Handling Volume 2004

Table 2 2005 Container Handling Volume by Port 1-30

Rank		Port	Volume（TEU）		Increase/Decreas	
05	04		2005	2004	（%）	（TEU）
1	2	Singapore/Jurong	23,192,200	21,329,100	8.7	1,863,100
2	1	Hong Kong	22,427,000	21,932,000	2.3	495,000
3	3	Shanghai	18,084,000	14,557,200	24.2	3,526,800
4	4	Shenzhen	16,197,000	13,650,000	18.7	2,547,000
5	5	Busan *	11,840,445	11,430,000	3.6	410,445
6	6	Kaohsiung	9,470,000	9,710,000	-2.5	-240,000
7	7	Rotterdam	9,300,000	8,300,000	12	1,000,000
8	9	Hamburg	8,050,000	7,003,479	14.9	1,046,521
9	10	Dubai	7,619,222	6,428,883	18.5	1,190,339
10	8	Los Angeles	7,484,624	7,321,440	2.2	163,184
11	12	Long Beach *	6,709,818	5,779,852	16.1	929,966
12	11	Antwerp	6,482,029	6,063,746	6.9	418,283
13	14	Qingdao	6,310,000	5,139,700	22.8	1,170,300
14	13	Port Klang	5,543,527	5,243,593	5.7	299,934
15	17	Ningbo	5,191,000	4,005,500	29.6	1,185,500
16	18	Tianjin	4,801,000	3,814,000	25.9	987,000
17	15	New York/ New Jersey *	4,800,000	4,478,480	7.2	321,520
18	22	Guangzhou	4,684,000	3,308,200	41.6	1,375,800
19	16	Tanjung Pelepas	4,169,177	4,020,421	3.7	148,756
20	19	Laem Chabang	2,815,421	3,624,000	5.3	191,421
21	20	Tokyo **	3,759,000	3,580,000	5	179,000
22	21	Bremen/Bremerhaven *	3,735,574	3,469,104	7.7	266,470
23	26	Xiamen	3,343,000	2,871,000	16.4	471,300
24	23	Tanjung Priok	3,280,950	3,170,000	3.5	110,950
25	24	Gioia Tauro	3,160,981	3,261,034	-3.1	-100,053
26	25	Algeciras *	3,157,685	2,937,381	7.5	220,304
27	29	Yokohama *	2,900,000	2,576,522	12.6	323,478
28	30	Jeddah *	2,862,600	2,425,930	18	436,670
29	27	Felixstowe *	2,700,000	2,700,000	0	0
30	n/a	Dalian	2,651,000	2,211,200	19.9	439,800
合計			217,721,253	196,341,765	10.9	21,379,488

Data: Containerisation International, March 2006
Remark: * estimation by Port, **estimation by CI

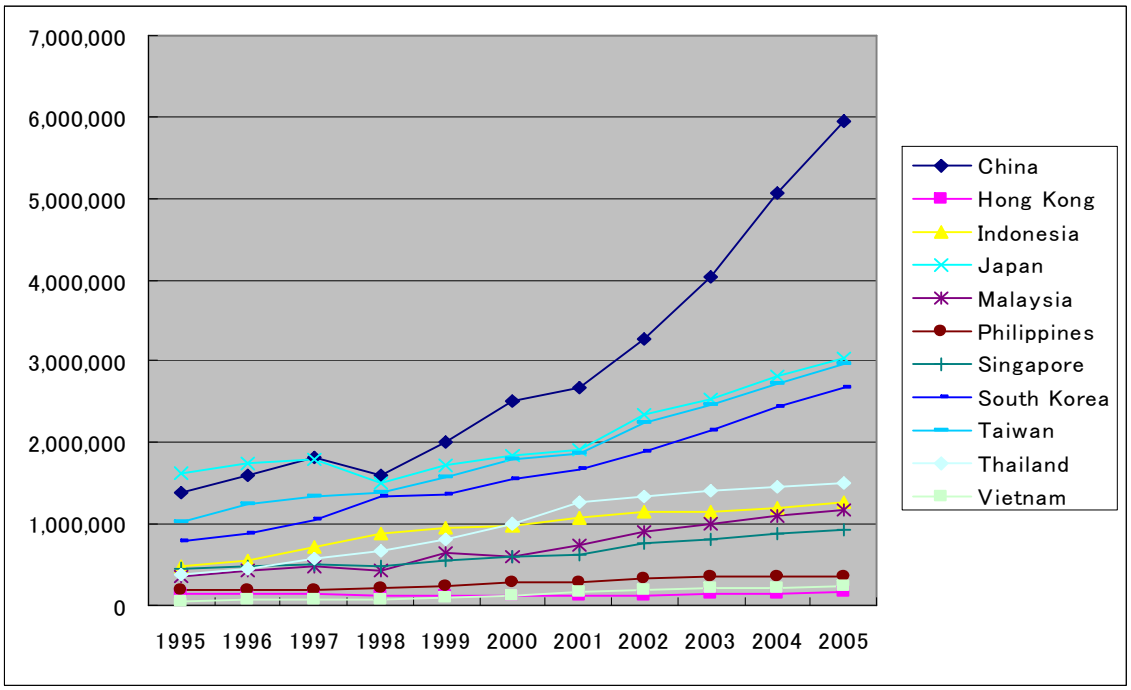
2.2 Increase of Intra-Asia Trade

Exportation from/to Asian countries has tripled its volumes for the past ten years. It is 11% increase a year based on a simple average. It gets a lot of looks that Chinese growth rate is particularly high. After the Asian monetary crisis, it has been going up steadily.

Table 3 Container Export to/from Asian countries Unit: TEU

Export Contry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
China	1,376,006	1,591,091	1,811,475	1,599,229	2,008,690	2,500,123	2,673,824	3,281,208	4,041,393	5,066,445	5,953,291
Hong Kong	132,542	132,918	139,309	124,198	125,358	124,454	127,048	126,107	135,282	147,846	158,071
Indonesia	467,902	538,802	724,620	884,445	951,672	975,579	1,067,790	1,147,289	1,151,386	1,199,384	1,262,816
Japan	1,633,742	1,745,975	1,794,740	1,504,034	1,731,714	1,840,882	1,906,111	2,331,972	2,532,054	2,807,970	3,032,339
Malaysia	359,855	431,092	475,516	435,815	644,143	597,933	750,921	916,647	1,003,253	1,097,481	1,175,960
Philippines	187,802	186,308	202,232	208,347	242,155	285,610	290,285	335,948	350,291	363,762	364,595
Singapore	443,645	468,711	508,779	475,567	546,243	598,002	615,930	752,681	801,996	879,428	934,868
South Korea	794,769	891,564	1,061,074	1,343,625	1,369,082	1,551,880	1,665,240	1,894,171	2,147,630	2,430,528	2,685,765
Taiwan	1,028,621	1,233,738	1,344,602	1,376,104	1,573,340	1,797,991	1,854,185	2,236,168	2,451,419	2,725,710	2,953,422
Thailand	382,962	451,507	571,830	657,408	818,895	992,352	1,261,502	1,348,860	1,419,680	1,455,410	1,501,481
Vietnam	52,740	64,757	82,040	73,585	103,297	128,759	168,397	198,059	215,054	222,496	236,565
Total	6,860,586	7,736,463	8,716,217	8,682,357	10,114,589	11,393,565	12,381,233	14,569,110	16,249,438	18,396,460	20,259,173

Data: "Container Shipping Report 2004/2005" Mitsui O.S.K. Lines



Data: "Container Shipping Report 2004/2005" Mitsui O.S.K. Lines

Figure 3 Container Export to/from Asian countries

Asia-related container trades have been increased rapidly. There is a remarkable situation; the increase of intra-Asia container trade mentioned previously. Note that it does not include trucking in intra-Europe trade. When Europe includes it to land transportation, its ratio of container trade must be the biggest in the world. Not more than intra-Europe, however, the intra-Asia container trade ratio is increasing sharply.

Intra-Asia trade ratio already exceeded 50% as of 2001. The ratio of intra trade out of Asian total trades goes far than it of NAFTA (North American Free Trade Agreement). It might indicate that Asian economy is getting more consolidated.

Backed by a rapid increase of container trade, the shipping companies who open out new liner services in Asian region have appeared. In a single year of 2004, new 40 liner services were open in Asian region, and 16 liner services were improved. Then, only a few liner services were newly established in 2005 due to the difficulty in supplying of the new containerships; the increase of shipbuilding price and a remarkable rise of chartering ship cost. The only route in 2006 was newly open.

Japan routes would be one of the vital sea routes in Asia, supporting Japan-Korea and Japan-China routes which were important in past. New container routes, however, do not call Japan ports any more. Shanghai/Singapore route or Shanghai/Vietnam route is getting outstanding.

Table 4 Trade Ratio in the Region

Area	1985	1990	1995	2001
East Asia	36.2%	41.6%	50.1%	50.8%
NAFTA	36.6%	36.8%	41.9%	46.3%
EU(15)	53.8%	64.9%	64.1	61.9%

Data : “Trade & Tax” 2004 May

Table 5 SITC expansion of Intra Asia Liner Services

Service	No. of vessels	Calling ports	Remarks
TJC	1,000TEUx3	LaemChaban/Bangkok/Hoh Chi Ming/Tokyo/Nagoya/Yokohama/Shanghai	Joint Service with MOL & RCL
CHN2	1,000TEUx3	Shaghai/Ningbo/HK/Maila/Bangkok/Laem Chabang	Own service
JTX	1,000TEUx4	Tokyo/Yokohama/Nagoya/Osaka/Kobe/Keelung/Taichung/Kaohsiung/HK/Bangkok/LaemChabang	Space charter from Chen Lee
CPX	1,800TEUx3	Dairen/Qingtao/HK/Manila/	Joint Service with GSL
KSX	1,500TEUx3	Pusan/Shaghai/Ningbo/HK/Port Kelang/Singapore/Keelung	Space charter from GSL
RSK	650TEUx2	HK/Hai Fong/Keelung/Taichung	Space charter from RCL
RSS	1,300TEUx3	Manila/Pusan/Shanghai	Space charter from RCL

Data: The Japan Maritime Daily etc.,
Notes: SITC Container Lines Originally China/Japan Liner Service and 2004 Enter Intra Asia Service;
First Intra Asia Service started 2004 and now 7 Loops.

3 Logistics Roles for Sustainable Development of Asian Economy and Trade

3.1 Trend of FTA in Asia

EU in recent promotes the deregulation policies based on the five principles; free movement, elimination of borders, subsidiary principle, minimum control of regal systems and mutual consent. As the liberalization on logistics and transport industries is facilitated by those principles, the deregulations are primarily carried out with the elimination of cabotage (1987), removal of tariff barrier (1993) and the liberalization (1994).

The result of a series of deregulation put the logistics companies in EU into tough competition, and the initiative of logistics industry was greatly changed. The company which began new logistics business service such as international inter-modal transportation or 3PL services survived out of the competition. The same situation was observed in U.S. from the end of 1970s. The deregulation in the field of transportation and development of new logistics service was getting more comprehensive.

Meanwhile, the reorganization of production bases or the international division of labor system in companies is accompanied with reorganization of physical distribution bases demanding the substantiality of a transportation network. Deregulation in the field of transportation is carried out by the process of EU unification. Companies tried to centralize its resources on a core business such as production or sales. Hence, companies outsourced the logistics processes. Logistics outsourcing, after all, became a trend. And 3PL services even represent logistics service now. 3PL services have been identified by the companies in developed countries such as Europe and U.S.

In Asia, the trend of market unification affected ASEAN with the elimination of high tariff ratio, the liberalization of investment, service trade and person movement. Those are the same trends with EU, even not so thoroughly compared with. AFTA (ASEAN Free Trade Area) already took effect in January 2003, and AFTA has accelerated to unify Asian market. On the process, the deregulation of transportation and logistics could be expected. Moreover, big market in East Asia comes out by regional integration. Free trade systems have been established, and they make international trade more vital.

Basically, manufacturing companies try to optimize their business processes by avoiding the same investment into every country. On the premise of high tariffs, they try to locate their production on the most suitable place. Manufacturing industry therefore plans to develop their whole supply chain in a region. Japanese automobile and electrical product industries have already developed their own supply chain management system remarkably. Increase of quantity of trade in the region, distribution leads non-tariff barrier toward a removal slowly. East Asia countries recognize the regional integration and high quality logistics service are essential to accomplish further economic development.

3.2 Transportation Network in Asia

Some cases of industry accumulation have been promoted in Asia; Thailand automobile industry, Malaysian IT industry and the Philippines electronic industry. And regional consolidation is deepening in accordance with the industry accumulation. On this account, international trade needs various transport modes such are air transportation, a truck, a railroad, river transportation as well as shipping. Seamless connection of various transportation modes is getting more important to internationally realize inter-modal transportation through transportation network.

There are a lot of issues on the transportation network, though. Here are some examples. It is not possible to use the same track between Thailand and Malaysia because of the problem in number plate. That means cargo must be reloaded to another truck at the border. Now only few trucks have dual number. Another

example is that Malaysian trucks can run in Singapore, but Singaporean trucks cannot even enter Malaysia due to regulation. In this way, the deregulation is more required particularly in mutual efforts.

3.3 The Different Situation of Logistics Infrastructure Development

The maintenance situation of road, railroad, ports and airport-related infrastructure has a big difference even among ASEAN countries. Singapore, Thailand and Malaysia have world outstanding container terminals and highway system. On the other hand, new comer states such as Laos and Cambodia has a short in the number of truck itself. And road, railroad and ports are insufficient also. As a matter of course, the divergence of national incomes between countries and the different logistics system can obstruct seamless goods movement in a region. Enhancement of logistics infrastructure and adjustment of difference in a region are necessary to support increasing trade. There are plans to maintain logistics infrastructure for construction of Indochina grid by a GMS (Greater Mekong Subregion) plan, but a speedup of the plan is quite necessary in the consideration about the rapid growth of trade.

3.4 Inland Transportation in Indochina

There is a rapid increase of trade between China and ASEAN, which brought the growth of transportation used Mekong river. The arrangement of the river routes are consequently pushed forward. EH (Early Harvest) started between Thailand and China from October 2003 in form to go ahead of each ASEAN country. The volume of *Mekong* river transportation (from Chinese *Yunnan* to Thailand) has risen directly by elimination of tariff on vegetables and fruits. It is a route to sail up Laos and Myanmar border from *Chansen* port in Thailand and to reach Chinese *Yunnan* / *Jinghong*. Most of those transportations are carried now by Chinese ships.

Shipping is an important factor for ASEAN transportation, but ASEAN has less equipped with transportation infrastructure of various modes such as road (truck), river transportation (inland waterway), and railroad than other regions. Truck will be more important in future. Speed of trucking functions in the place around borders such as between Malaysia and Thailand where are not separated by water. Malaysian port *Tanjun Pelepas* started to transport containers to Bangkok in conjunction with railroad. Trucking service in addition is supported from Malaysian Port *Klang* to Bangkok led by *Nippon Express Inc*., a Japanese logistics company. The distance is 1,800 kilometers and it takes three days (including one day for custom clearance). When electronic parts are exported to Bangkok from Malaysia, truck can transport container faster than domestics shipping, although they spend one day for entering in their border.

Moreover, there are borders which are not separated by river; Thailand of *Mekong* basin, Vietnam, Laos, Cambodia, Myanmar, and Chinese *Yunnan*. Road maintenance of full length 4,000 kilometers is to be planned by Asian Development Bank. It will be completed in 2007. It is called GMS (Greater Mekong Subregion) plan. Three routes are developed at the same time; East corridor of 1,500 kilometers, North-South corridor of 1,200 kilometers and South corridor linking Cambodian *Phnom Penh*. Vietnamese *Ho Chi Minh* via *Angkor Vat* from Bangkok is pushed forward.

Inferring from these situations, trucking is going to increase in future due to the enhancement of roads in Indochina. Whereas, it takes much time to transport containers by passing through a border now. And, it is not able to transport without authorization trucks. There are many problems to solve. Although it will take time, the elimination of non-tariff barrier can be expected with other deregulations in Asian countries through the progresses of economic unification starting market integration.

3.5 Necessity of the Improvement of Container Terminal

The maintenance of container terminals is pushed forward in U.S.. It is assumed that U.S. west coast was so limited that U.S. constructed east cost terminals. For instance, *Mitsui O.S.K. Lines* started to construct Jacksonville container terminals. These improvements are obviously from the incident occurred at *Los Angeles* and *Long Beach* in 2004. The incident resulted by the insufficient facilities and lack of labors as well as lack of rail road facilities and caused terrible congestion of container terminals. Consequently supply chain was destroyed and brought the serious damage in container trade.

Another reason of the necessity of terminal improvement is in the increasing size of containerships. Containerships are upsizing day by day. As examined previously, large-size containerships more than 8,000 TEU appear from 2006. As a result, it is expected that the supply of loading capacity will increase more than 10 % annual average in main routes of Asia / European route and North America routes. *Piers, Drewry* and big Japanese liner companies forecast that both demand and supply of container capacity will increase 2 digits in 3 years. And the demand for container terminals is going up in accordance with the increase of the size of containerships.

Table 6 History of containership size

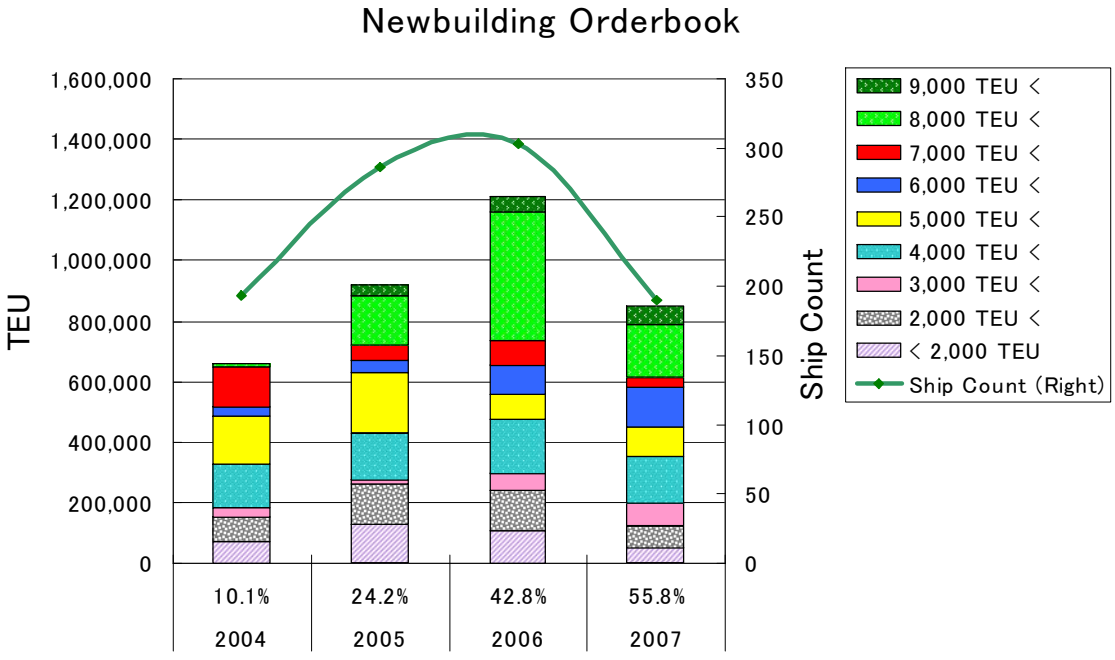
Asia / Europe		Year	Trans Pacific	
Sea Land (Gateway City '57)	35'x226	1966		
		1967	Matson	24'x465
		1968	NYK(Hakone Maru)	752TEU
			MOL(America Maru)	716TEU
TRIO GROUP	2,100-3,000TEU	1971		
		1973	Verazano Bridge	2,068TEU
		1980/84	Maersk	2,100-3,000TEU
		1981	APL	2,284TEU
		1982	APL	2,750TEU
		1984/85	USL ECON Ship	4,148TEU
TRIO GROUP and Others	3,500-3,700TEU	1988	APL *Over Panamax(C10)	4,300TEU
Nedlloyd *Hutch coverless	3,568TEU	1991		
CGM/MSC *Over Panamax	4,427TEU	1991-92		
Nedlloyd *Hutch coverless *Over Panamax	4,112TEU	1994-95		
NYK	4,800TEU	1995	COCL	4,950TEU
MOL	4,750TEU			
Maersk	6,000TEU	1996	COSCO	5,250TEU
HYUNDAI	5,550TEU		EMC	5,364TEU
Maersk"Sovreign Maersk"	6,600TEU*	1997		
P&O Nedlloyd	6,674TEU	1998		
		1999	NYK	6,208TEU
			Maersk Sealand	6,600TEU
Hapag-Lloyd"Hamburg Express"	7,179TEU	2001		
COCL"COCL Shenzhen"	8,063TEU	2003	P&O Nedlloyd	6,674TEU
MSC	9,000TEU	2005		
Maersk-Sealand"Emma Maersk"	11,000TEU	2006		

Data: The Japan Maritime Daily etc.

Table6 shows the history of container size from 1966. It was 1966 that *Sea Land* put the containership into overseas transportation. The first containership was "Gateway City", re-modeled and had a 226-loading container capacity (35 feet container). In 1988, APL launched 4300 TEU type containership C-10. It is called over-panamax or post-panamax, which size was exceeded the size passing through Panama Canal. After C-10, as for the containership, post-panamax size became the mainstream, and after this, upsizing of containerships was accelerated. The containerships that can load over 10,000 TEU appear soon. That indicates the loading capacity have been upsized more than 20 times greatly for last 40 years.

In 2003, a large quantity of containerships was ordered under good business results and favorable condition of sea transportation. Order of particularly large-scale containerships gets a lot of looks. More than 40% of ordered containerships were 8,000 TEU size in 2003. These large-size containerships are completed successively in 2006. Dockyards are approximately fully occupied by 2008, and, as for the quantity of loading capacity, increase of 13% annual average is anticipated from 2006 to 2008. Lots of large size containerships (more than 8,000 TEU) would be expected to launch after 2006. At the same time, handling of the container cargo is going up more and more. For the main ports, improvement and expansion of container terminals were hastened.

That implies that container terminals in Asian countries have to been taken measures to those trends. It is necessary to get container terminals ready as the one of infrastructure factor. Particularly, China and Southeast Asian countries have to put their efforts into improvement of their container terminals, because they are playing a big roll not only as world's factories but also as new markets. For the terminal maintenance, the depth of quay should be over 15 meters (Regarding this, see table7). And the gantry crane should be equipped with 18 row lengths to support containerships of 8,000 TEU or 10,000 TEU type in ports.



Data: "Container Shipping Report 2004/2005)" Mitsui O.S.K. Lines

Figure 4 Containerships order book

Table 7 World main Ports Terminals Draft & G/C for over 8000TEU containership

		Port	Terminal	G/C	MAX Draft (m)	Possiblility	
						G/C	Depth
2003 Top20 Ports	1	Hong Kong	HIT(Terminal9)	22 × 9	15.5	○	○
	2	Singapore	Tnajong Pagar	18	14.6	○	×
			Keppel	18	14.6	○	×
			Pasir Panjang	18 × 24	15.0	○	○
	3	Shanghai	WGQ	18	14.2	○	×
	4	Shenzhen	Yantian(YICT[PhaseⅢ])	23 × 18	16.0	○	○
			Shekou(SCT[PhaseⅡ])	20 × 8	17.0	○	○
			Chiwan(CCT[PhaseⅡ])	22 × 17	16.0	○	○
	5	Busan	PECT	18	15.0	○	○
			HBCT	SP × 3 × 10	15.0	○	○
			GANMAN(HGCT)	SP × 4	15.0	○	○
	6	Kaosiung	APL(68/69)	18 × 2 、16 × 4 、13 × 1	14.0	○	×
			HMM(75)	17 × 3	14.0	×	×
	7	Los Angels	TraPac	18 × 1 、15 × 4	13.7	○	×
	8	Rotterdam	ECT Delta Terminal	× 23	16.6	○	○
	9	Hamburg	Burchardkai Terminal	SP × 3	16.5	○	○
	10	Antwerp	Delwaide Dock Terminal		16.1		○
	11	Dubai	Jebel Ali	SP × 6	14.0	○	×
	12	Port Klang	KCT North	SP 、PP	15.0	○	○
			KMT West	SP × 20	15.0	○	○
	13	Long Beach	CUT(HMM)	18 × 3 、16 × 2	14.6	○	×
	14	Qingdao	QQCT	SP × 24	15.0	○	○
	15	NY/NJ	H.HOOK	15 × 4 、13 × 2 、12 × 1	12.2	×	×
	16	Tanjung Pelepas	Phase Ⅰ ＋Phase Ⅱ	22 × 10 、18 × 14	16.0	○	○
	17	Tokyo	TICT	18 × 3 、17 × 3	15.0	○	○
	18	Bremen/Bremerhaven	Eurogate Container Terminal	PP × 7 × 12	14.5	×	×
	19	Laem Chabang	Tips	13 × 3	14.0	×	×
			ESCO	15 × 1 、13 × 2	14.0	×	×
			A2	PP × 3	14.0	×	×
	20	Gioia Tauro	Medcenter	20 × 4 、18 × 6 、17 × 18	15.5	○	○
Others		Yokohama	YICT	16 × 2 、15 × 1	15.0	×	○
		Nagoya	NCB	17 × 2 、16 × 2 、13 × 2	12.0	×	×
		Kobe	KICT	16 × 5	15.0	×	○
		Hakata	アイランドシティ	17 × 2 、16 × 2	14.0	×	×
		Kwanyang	HMM	18 × 10	16.0	○	○
		Seattle	Terminal5	17 × 5	15.0	○	○
		Oakland	TraPac	18 × 1 、16 × 2	12.8	×	×
		Tacoma	WUT	18 × 4	15.5	○	○
		Portland	T6	PP × 2	12.2	×	×
		Vancouver	Delta Port	20 × 2 、18 × 4	15.9	○	○
		Norfolk	NIT	22	12.5	○	×
		Charlston	Wando	SP × 4 、PP × 4 、P × 2	13.7	○	×

Data: Mitsui O.S.K. Lines, Research Office

Notes; SP= Super Post Panamax, PP=Post Panamax, P=Panamax

Objects=Top 20 Ports

Max Draft 15m (at quay) & Gantry Cranes with 18 row lengths necessary for 8000TEU container vessel.

3.6 Shortage of Logistics Specialists

There are many problems in realization of the market unification; liberalization of a capital flow or person movement, removal of delay and opacity in customs, the standardization of cross-certification and customs cord, removal of non-tariff barrier, law adjustment on the transportation / distribution and etc.

Moreover, lack of human resource is one of the biggest problems. Although Asia has plenty of inexpensive labor, many companies are underhanded. They have difficulty hiring educated labors, particularly in logistics department. Only few countries support a logistics education, there is insufficiency in supply of well-educated human resource. TTK LOGISTICS (THAILAND) that operates Toyota logistics in Thailand established an education center for its own drivers. Otherwise, it makes its employee go to a center in Japan regularly. On the other hand, demand of human resource is going increasing rapidly in logistics management as well as in logistics operation.

There is a rare case that China introduced a system to certify logistics managers as a national qualification in 2003. Certified logistics managers are classified into three; associated managers, managers and superior managers. And they are certified by *Chinese Logistics Society* and *National Standardization Technical Committees*. Logistics education centers give a chance to participate in the logistics education programs to those who have experiences for more than two years in logistics with university degree. Certified logistics managers would be registered at human resource centers. Now China has approximately 12,000 certified logistics managers.

Many countries in Asia have few institution or organization for the logistics technologies even in universities and logistics industry. Regarding the roles of logistics on sustainable development of economy, countries' encouragement for the education of logistics would be more required.

4 Conclusions

This paper examined the trends in logistics and considered the issues and problems as follows:

(1) Insufficient and delayed establishing intra-Asia Shipping Service Network was brought by fully occupied ship yard, high costs on vessel building, charter, bunker and etc.

(2) In Asia, although there are a number of container terminal facilities in Singapore and Malaysia, there is a lack of these facilities in other countries such as Myanmar and Vietnam. They need to be further improved as their domestic shipping facilities in ports.

(3) Inter-modal connections, such as railroad and truck, need to solve the problems. Apart from improving inter-modal connections, it is also necessary to consider software measures of institutional and law-related measures to encourage inter-modality. For instance, trucking between Thailand and Malaysia is required to unload and reload at their cross border.

(4) It has been observed that the congestion that occurred in 2004 in container terminals of LA, Rotterdam, Le Havre and other ports was attributed to lack of longshoreman of terminals and insufficient facilities of railroad connection to container terminals. The unexpected rapid increase of container cargo further aggravated the situation in those terminals. Hence, the lesson learned from this incident is that the sustainable development of logistics and trade in Asia needs to involve such things and come up with measures on how to minimize their impacts on trade and movement of commodities.

(5) The lack of human resource in the field of logistics could be another issue in Asia. In order to be at par

with their counterparts, particularly global enterprises, it is essential to provide high quality in logistics. For that employees should be well educated. This implies that there is necessity to develop education programs not only for manager but also for operators including container terminal workers, truck drivers, or other workers.

(6) In recent, advanced logistics are supported by not local logistics companies but foreign logistics companies that carry out 3PL business. There is a reason in insufficient quality of local logistics companies. For economy growth of local country, the promotion for high quality local logistics companies would be required.

In conclusion, for sustainable development in Asia, it is necessary to solve the problems examined in this paper and to establish seamless logistics system among Asian countries including inter-modal transportation.

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