

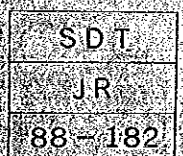
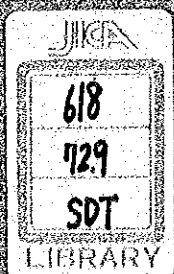
THE STUDY ON THE INTERNATIONAL INTERMODAL TRANSPORTATION SYSTEM

— with special reference
to the Mini-Land Bridge —

SUMMARY
REPORT

OCTOBER 1988

JAPAN INTERNATIONAL COOPERATION AGENCY



**THE STUDY ON THE INTERNATIONAL
INTERMODAL TRANSPORTATION SYSTEM**

—with special reference
to the Mini-Land Bridge—

20747
JICA LIBRARY



1080258(5)

**SUMMARY
REPORT**

OCTOBER 1988

JAPAN INTERNATIONAL COOPERATION AGENCY



P R E F A C E

Based on the Diplomatic Notes signed by the Governments of the United States of America, the Republic of Panama and Japan on September 26, 1985, the Governments of the 3 nations have decided to conduct a Study of Alternatives to the Panama Canal. The Government of Japan entrusted the Japan International Cooperation Agency (JICA) to carry out the study.

From July 6 to 15, 1988, JICA dispatched a survey team, headed by Mr. Junsaku Koizumi, Deputy Director of Social Development Cooperation Department, JICA, consisting of 4 experts in relevant fields to the United States of America. The survey team conducted a study of the International Intermodal Transportation System with special reference to the Mini-Land Bridge in the United States of America, collected necessary data and information, and exchanged views with the concerned US officials.

This is a summary of the captioned study. In submitting this summary report, we wish to express our sincere appreciation to the US officials concerned for their wholehearted cooperation and courtesy extended to the survey team.

October 1, 1988

Hiroaki Tamamitsu
Executive Director
Japan International
Cooperation Agency

Contents

1. Trade Pattern in Pacific Rim	1
2. Railroads	6
3. The U.S. Pacific West Coast Ports	11
4. Decisive Factors for the Future Trend	16
5. The Impact the Trans-Continental Transport Service	
Gives on the Transportation via Panama Canal	22

1. Trade Pattern in Pacific Rim

- (1) The share of the Asian Pacific Region countries in the world trade increased from 16.6% in 1980 to 24.4% in 1986, and its intra-regional trade ratio also increased from 53.6% in 1980 to 64.6% in 1986. The growth rates of export in 1986 and 1987 of the U.S.A., Japan, and the Asian NIES countries show that while Japan made negative growth of 1.5% in both of the years, those of the U.S.A. were 0% in 1986 and 11.5% in 1987. The impact of the Yen exchange rate appreciation is clearly shown in the case of Japan, and in the mean time the Asian NIES countries expanded their export by 17% in 1986 and 22% in 1987 over their previous years. The trade picture of the Asian Pacific Basin shows a conspicuous growth of the Asian newly industrialized countries in their export to the U.S.A. This trend is clearly reflected on the growth rate in the number of imported containers into the U.S.A.
- (2) Cargo moving via Panama Canal averages around 140 million tons per year, and its largest group of the items consist of petroleum and petroleum products that amount to 30 million tons. The volume of petroleum was on the increase until 1982, but since then its tonnage has stagnated at around 30 million tons per year because of the diversion of the Alaskan crude to the pipeline along the canal which was completed in 1983. The second largest volume consists of grain at around 23 million tons. A large portion of it is the export from the U.S.A. to Japan and other Asian countries, of which annual volume fluctuates widely. Coal, phosphate ore, and iron ore follow it in the order of volume. While coaking coal Japan imports from the U.S.A. is routed via Cape Town, some Asian countries import coal for burning from the U.S.A. through Panama Canal. The cargo passing through the Panama Canal that is packed in the containers are other miscellaneous items as well as canned and

frozen foodstuff. In connection with the prospective freight for the transcontinental transportation under this survey, the grain exported from the U.S.A. and containerized cargo destined to the U.S.A. are considered the most susceptible to the competition between the routes.

(3) The Table 1 compares the tonnage of containerized and loose dry cargo handled at the various ports on the U.S. West Coast. Although the dry cargo itself has increased steadily at 7.7% annual rate, the containers handled increased far more rapidly at an annual average of 15% and shared approximately 50% of the total dry cargo handled in 1987. The deregulation of the railroad industry through the Staggers Act of 1980 and the consequent rationalization and technical innovation have greatly contributed to creating the favorable circumstance for the management of railroad transportation. The port authorities of the related ports responded to the changing circumstance by expanding and improving the container cargo handling facilities. Approximately 70% of the containerized cargo from the Far East and Southeast Asia enters the continental U.S.A. via its West Coast ports, and about 20% of it is moved on the surface to the East Coast and the Gulf areas. The containerized cargo carried through this Mini Land Bridge service amounted to almost 3 million tons in 1987, or about 35% of the total number of containers transported to the East Coast and the Gulf areas.

(4) The grains exported from the U.S.A. are mostly wheat, corn, and soybean. These crops are raised in different regions of the States. The geographical locations of their croplands require the grain to be carried by rail to the West Coast, or barged down the Mississippi to New Orleans and then through Panama Canal. The spring wheat is routed via the West Coast

while the soybean as well as corn are routed via the Gulf ports as well as the West Coast. Their routes are dictated by economic principles of which parameters vary day by day.

- (5) The directional movement of the containerized cargo unloaded at the ports on the West Coast shows that its majority is naturally destined for consumption in California, but not small portion of the containerized cargo moves on the surface to the Middle West and Northeast coast. The recent increase in this directional movement may be attributed to the recovery of heavy industry production activities in the vicinity of Chicago, where the Japanese industries are very actively making investment in the manufacturing facilities, requiring an increasing amount of supplies for finished products, such as spare parts. The rapid industrialization of inland points such as Dallas and Atlanta where the labor supply is abundant and free from the labor union disputes contributes to the relative decline in the functions the East Coast ports used to fulfill.

TABLE 1. OCEAN LINER CARGO IMPORTED INTO THE U.S.A. AND
SHARE OF WEST COAST PORTS IN THOUSAND SHORT TONS

YEAR	WORLD TRADE TOTAL			FAR EAST			SOUTH EAST ASIA		
	TOTAL	WEST COAST	Percen- tage	TOTAL	WEST COAST	Percen- tage	TOTAL	WEST COAST	Percen- tage
1976	24,641	5,890	23.9	6,827	3,696	54.1	1,835	593	32.3
1977	25,467	7,287	28.6	7,520	4,632	61.6	1,915	653	34.1
1978	28,571	7,703	27.0	7,853	4,690	59.7	2,061	739	35.9
1979	27,495	7,791	28.3	7,166	4,551	63.5	2,200	880	40.0
1980	26,231	8,094	30.9	7,383	4,836	65.5	1,826	790	43.3
1981	28,591	8,699	30.4	8,110	5,309	65.5	2,111	815	38.6
1982	26,655	8,512	31.9	8,215	5,484	66.8	1,770	757	42.8
1983	29,822	9,925	33.3	9,575	6,514	68.0	1,830	765	41.8
1984	36,887	12,399	33.6	12,188	8,446	69.3	1,970	870	44.2
1985	41,118	15,124	36.8	14,178	10,200	71.9	2,168	1,055	48.7
1986	44,225	17,583	39.8	16,090	11,863	73.7	2,469	1,265	51.2
1987	46,849	19,131	40.8	16,379	12,253	74.8	2,879	1,415	49.1

TABLE 2.

OCEAN LINER CARGO IMPORT FROM FAR EAST AND SOUTH EAST
ASIA TO U.S. WEST COAST AND EAST COAST
IN THOUSAND SHORT TONS

	1979	1980	1981	1982	1983	1984	1985	1986	1987
U.S. IMPORTS	9,367	9,209	10,221	9,985	11,405	14,634	16,346	18,558	19,258
WEST COAST IMPORTS	5,431	5,626	6,124	6,241	7,279	9,710	11,253	13,128	13,668
EAST COAST IMPORTS	3,936	3,584	4,098	3,745	4,126	4,924	5,093	5,430	5,590
W.C. % of U.S.	58.0	61.1	59.9	62.5	63.8	66.4	68.8	70.0	71.0
MINIBRIDGE IMPORTS	1,080	1,250	1,463	1,510	1,745	2,135	2,032	2,743	2,992
MB % OF W.C. IMPORTS	19.9	22.2	23.9	24.2	24.0	22.0	18.1	20.9	21.9
MB PENETRATION of TOTAL B.C. MARKET	21.5	25.9	26.3	28.7	29.7	30.2	28.5	33.6	34.8

Source: "Trade Analysis - Pacific Basin, 1988" by Oakland Port Authority

2. Railroads

- (1) The number of operating railroads in the U.S.A. amounts to 500, and they are classified into five classes of I, II, III, IV, and V according to the annual operating revenues. Those in Class I category in the fiscal year of 1987 were the 16 railroads that attained the annual operating revenue of more than \$88 million for the year. The shares those 16 railroad companies had in the entire U.S. railroad systems were predominant, being 94% of industry revenue, 91% in the number of employees, and 83% in mileage operated, respectively. The only public railroad transportation, offered exclusively for the passenger services, is provided by the Amtrak.
- (2) Changing shares of various modes of transportation in the U.S.A. The annual amount of ton-miles of inland freight transported in the 1980s has remained at around 2.5 trillion, of which approximately 900 billion ton-miles were carried by the railroads. The share of the railroads however had shrunk, when compared with other modes of transportation, to 36% in 1986 from 75% it retained in 1929.
- (3) The Act to Regulate Commerce was passed by Congress in 1887 and the Interstate Commerce Commission, or the ICC, was created to enforce the act. More than thirty legislations were added since then to increase the powers of the ICC to enforce its regulatory actions. The most influential regulatory powers endowed with the ICC were the following three:
 - (a) the legalization of ICC to approve the rates submitted by the rate bureaus of the railroads (1948),
 - (b) the regulation of the minimum rates as well as the maximum rates (1958), and
 - (c) the granting of subsidy by the Administration (1976).

While the railroad regulatory legislations were intended for the sound growth and support of the railroads, the cumulative and excessive regulations deteriorated the profit-making ability of the railroads, and the inflexible attitude on the part of the ICC in the railroad regulation became a controversial issue in Congress, and the Staggers Act was enacted in October 1980 for the purpose of revitalizing the railroad industry through the deregulation. Its specific aim rested in the modification of the ICC regulations whereby a freer and more competitive market would be formed out of the railroad industry to instigate the competition among the carriers, reform the organizational structure of them to become able to rapidly cope with the changing market, and consequently enhance their profitability. The Staggers Act has thus resulted in;

(a) a greatly increased latitude in setting the rates,

(b) the removal of many restraints on contracts for carriage, and,

(c) the simplification of procedures for abandonment of routes, acquisition of other railroads or merger with them.

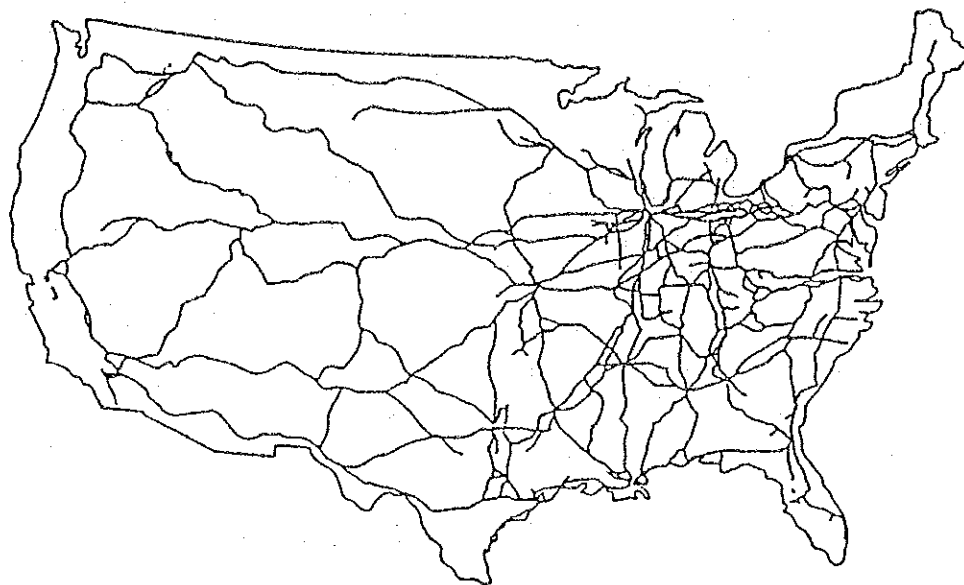
(4) The railroad companies have striven to rationalize their operations in order to survive in the stagnated business field that remained slumped for a long time, and aggressively promoted technological innovations and took restructuring measures of which an exemplary case is the double-stack container trains (D.S.T.) which have been contrived to fulfill the need for rapid and low-cost inland carriage of surging traffic of international containers. Major actions taken by the railroads for their reconstruction were the following:

(a) the sale of local lines,

- (b) the introduction of the hub system (interchange depots for rail and truck transportation),
- (c) the adoption of technological innovations of double-stack trains (the trains consisting of flat cars with twin stacks of containers loaded on them), road trailers, etc.,
- (d) the expansion and modernization of the inter-modal container transfer facilities at major sea ports, and
- (e) the reduction of the labor force.

The railroads that were subjected to excessive regulatory actions in the past that led to their deteriorated profitability and forfeiture of competitive capability vis-a-vis other modes of transportation seem to have improved the rate of yield through the Administration's deregulation as well as their own new policies.

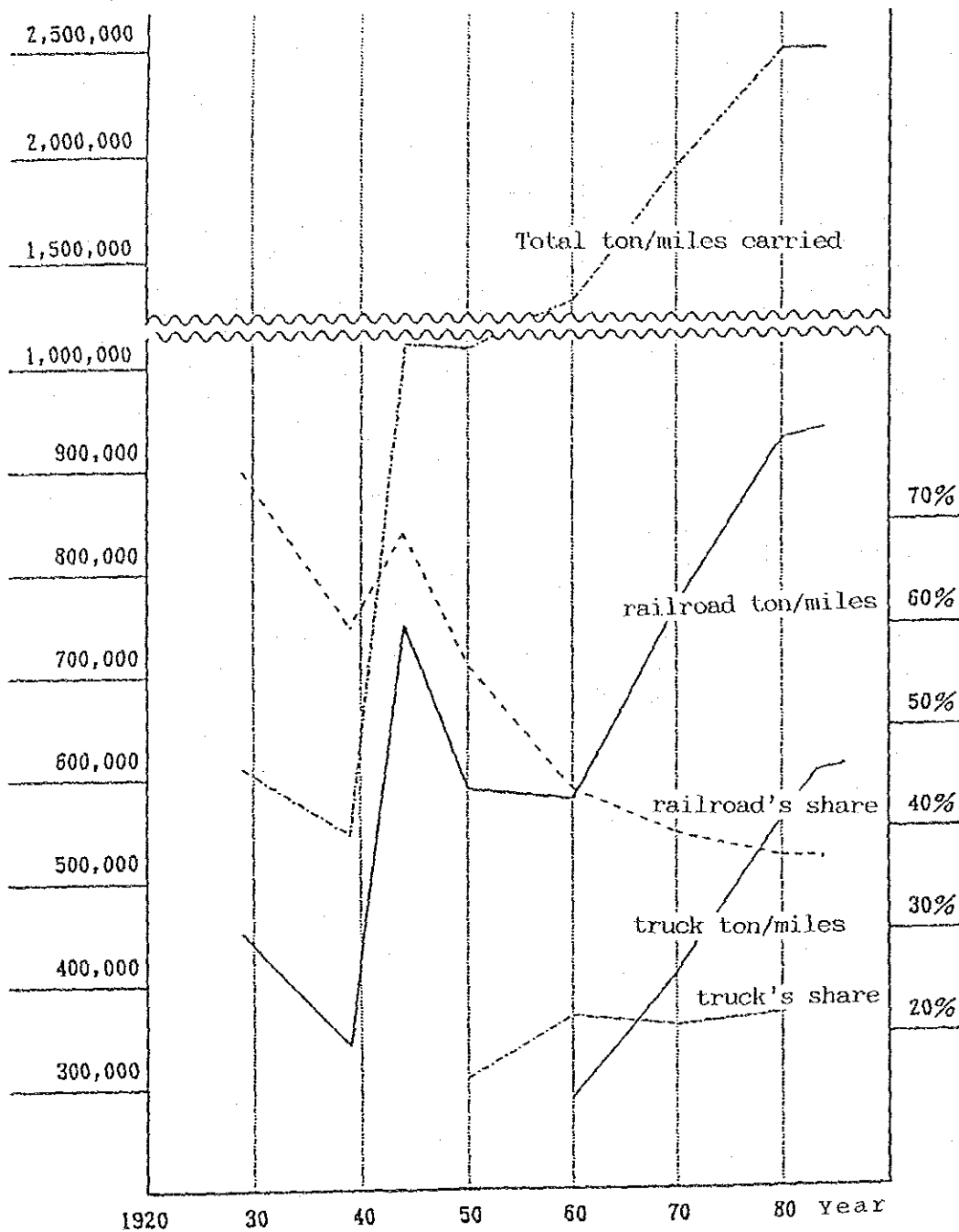
FIG. 1. THE RAILROAD NET OF CLASS I



Source: Federal Railroad Administration Network Planning
Information System

FIG. 2. THE TON/MILES CARRIED BY RAILROAD AND TRUCK

t = million ton/miles)



3. The U.S. Pacific West Coast Ports

- (1) The traffic volume of containers handled at the U.S. Pacific West Coast that serve as gateway for the Mini Land Bridge service has increased two-fold during the seven-year period from 1981 to 1987. The growth especially since 1984 has been in strides. With the West Coast geographically divided into two regions, the Pacific Southwest shared 70% of the total, wherein the pair of Long Beach and Los Angeles took 50% and the Oakland/San Francisco took 20%. The remaining 30% was shared by Seattle, Tacoma, and Portland, the Pacific Northwest ports. The five major ports on the U.S. Atlantic East Coast of New York, New Jersey, Baltimore, Charleston, Savannah, and Hampton Roads, on the contrary, handled a total of 4 million TEUs in 1987 against the 4.4 million TEUs they handled in 1985, a decline by 10% over two years. Their traffic is in general on the decline or in stagnation.
- (2) The hull capacity of full-container ships in the world has reached 20 million gross tons, or 1.22 million TEUs, with 840 vessels at the end of 1987, showing the average annual growth of 6.6% since 1983, and the ships are becoming larger year after year. Especially the attention of the world shipping industry was focused in 1988 on the container ships of the Post-Panamax type the American President Lines (APL) commissioned, each of which accommodates 4,300 TEU and its wide beam exceeds the the Panama Canal passage limitations. These container ships call on their regular run at seven ports of the Pacific Basin, namely, Los Angles, Oakland, Yokohama, Kobe, Nagoya, Hongkong, and Kaohsiung. Five ships of that class were placed in the service in 1988. The other full-container ships on order are the 3 largest PANAMAX models accommodating 3,900 TEUs belonging to

Maersk Line, 2 ships of 3,800 TEUs of Evergreen Marine, 2 ships of 3,600 TEUs of NYK. All of them are still of PANAMAX models, and that fact indicates that the main fleets of the container ships are still consisted of the PANAMAX type.

- (3) The handling cost of an international container from the ship to the rail yard is estimated to be in the range of \$30 and \$80, although the actual amount varies according to the geography, etc. For the sake of saving such handling cost as well as the total transportation time, every port is making efforts to construct and maintain the most efficient ICTF where the containers are interchanged between the different modes of transportation. The largest and newest ICTF facility is constructed by the Southern Pacific Transportation Co. in 1986 to handle the containers for both Los Angeles and Long Beach ports, and attracts the attention of the transportation service industry. The brief outline is as follows:

This ICTF is located 4.4 miles away from both Los Angeles and Long Beach ports, and has handled 680,000 TEUs (22%) out of more than 3 million TEUs processed at these two ports in 1987.

- (4) The targeted traffic volume to be handled at the ports of Los Angeles and Long Beach in 2020 is, as disclosed in 1988, expected to be about 200 million tons, three times as large as that of 1985, of which 65 million tons are to be containerized (65 million tons in containers, or 5.6 times as large as the present container cargo volume.)

There are two plans for construction of the handling facilities which are called the Schemes A and B, of which final selection has not yet been made. According to the Scheme A which was disclosed in 1988, 39 new terminals are to be constructed (including 11 container terminals having 22 berths) in the 2,480 acres located in the New

Landfill Area at the total budget of \$4.8 billion. The interesting points in this scheme are:

(a) The container yard and container freight station (CFS) are located at the back of the container berth, and further inland at about 1,000 feet from the water front is the ICTF which is intended to be as close to the berth as possible to be on dock, and

(b) the water depth criteria for the container vessel are set at 50 ft MLLW in preparation for the berthing of larger container ships in the future.

As shown in this scheme, a future container berth will have a wide area of harbor land (in the instance cited above, 90 - 110 acres per module [2 berths]) from which on-dock ICTF the containers will be transported more economically and efficiently.

The Pacific West Coast ports are competing with each other for attracting cargo traffic by developing their own rationalization programs compatible with the individual geographical characteristics and the conditions of respective inland areas. The case of Los Angeles/Long Beach is an exemplar of such movement.

TABLE 3. CONTAINERIZED TRAFFIC HANDLED AT MAJOR PACIFIC WEST COAST PORTS (Unit = 1,000 TEUs)

PORT	1981	1982	1983	1984	1985	1986	1987
Long Beach	554	715	798	1,141	1,172	1,394	1,460
Los Angeles	621	606	734	908	1,104	1,325	1,580
San Francisco	90	91	94	80	107	97	116
Oakland	775	802	805	916	856	915	954
Portland	80	74	100	123	111	105	N.A.
Tacoma	127	135	139	150	505	666	697
Seattle	805	804	950	1,150	845	851	1,026
TOTAL	3,052	3,227	3,620	4,368	4,700	5,363	about 6,000

Source: Containerization International

TABLE 4. MAJOR SPECIFICATIONS OF POST-PANAMAX TYPE CONTAINER SHIP

Length, Overall	903 ft.
Beam	129 ft.
Draft, Maximum	41 ft.
Displacement	77,000 metric tons
Container loading capacity ..	4,300 TEUs
Bulk loading capacity (grain)	30,000 metric tons
Operating speed	24 knots
Engine horsepower	57,000 h.p.

DIMENSIONS OF PANAMA CANAL LOCK CHAMBER

Length	1,000 ft.	Permissible length 950 ft.
Width	110 ft.	Permissible width 106 ft.
Allowable draft	in the range of 36 - 40 ft. depending on the elevation of waters of the Gatun and Miraflores Lakes.	

TABLE 5. OUTLINE OF INTERMODAL CONTAINER TRANSFER FACILITY (ICTF)

1. MAIN TERMINAL: 146 acres -- more than 1.3 miles long, and 900 feet wide.
2. STORAGE TERMINAL: 87 acres
3. TRACKS: 5 loading/unloading tracks and 2 running tracks comprise a total of more than 7 miles of trackage
4. STORAGE TRACKS: More than 7 miles
5. CENTER ROW PARKING AREAS: 3 rows consist of 2,200 container stalls
6. ALL-WEATHER COMPUTERIZED GATE COMPLEX: 16 lanes with 14 pre-check intercom stations
7. GATE PROCESSING CAPABILITY: 230 containers per hour
8. MAIN TERMINAL TRACK CAPACITY: 18 doublestack railcars
9. TRUCK PROCESSING TIME: 15 minutes average
10. TRUCKING TIME FROM HARBOR FACILITIES: Less than 15 minutes both from Los Angeles and Long Beach harbor facilities
11. CRANES AND PACKERS: Overhead cranes - 8 units; and Port packer - 1 unit
12. OPERATING HOURS: 24-hour per day, 7 days per week
13. ELECTRONIC DATA INTERCHANGE: Electronic Data Interchange (EDI) between ocean carriers and SP prior to vessel arrival at the port initiates ICTF operational pre-planning process.
14. REAL-TIME DATA EXCHANGE: A real-time data exchange capabilities between port marine terminal and ICTF to help expedite truck transfers.
15. COMPUTER TERMINALS: More than 50 computer terminals within the ICTF facilities for data access and entry functions.
16. YARD TRACTORS: All yard tractors are equipped with mobile data terminals which are linked to the computer system for real-time container status reporting.

4. Decisive Factors for the Future Trend

- (1) The objective set for this study is to clarify the present state of the Transcontinental transportation system in the U.S.A. and to forecast its impact on the traffic being routed through Panama Canal. The task has been so overwhelming and exacting under the given period of survey time and conditions that the report thereof probably contains some hasty and therefore risky conclusions.

Through the analyses of the data accumulated during the latest visit to the locations and personnel of various fields concerned may, however limited in scope, indicate a general direction toward which the trend is moving.

- (2) It is never a monolithic, or single factor that determines the future mode of transportation of containerized and grain shipments, but multiple factors work and influence each other for such determination. If we define the "future" to be after ten years from now, the buds of the determinant factors for the future must be growing in the "present." The buds or seedlings we can observe now have been scrutinized as to their future potentials. The current forecasting technique for the future after a decade from now may involve too many uncertain factors, and such a "future" may only be projected along the extension of the trend we estimate for the coming ten year period.

- (3) The evaluation of the determinant factors on the routing of containerized cargo through Mini Land Bridge or via Panama Canal has led us to the conclusion that:

- (a) The current trend of the trade in the Pacific Region. The substantial economic growth of the NIES and ASEAN countries and resultant increase of trade with the U.S.A. has resulted in feeding an increased amount of traffic both to the Mini Land Bridge and Panama Canal.

This trend is believed to remain in the future.

(b) The innovative facilities and technologies in handling containerized traffic in support of the Mini Land Bridge, such as terminal functions of the ICTF as well as DSTs of the railroads, and the operation of the largest container ships of super-Panamax class. In consideration of the fact that even a Panamax class ship is now restricted of its dimensions when going through the Canal, Mini Land Bridge may reap more competitive advantages in respect with this point, despite the rapidly increasing investment in the expansion harbor facility on the U.S. East Coast.

(c) The increasing importance of the U.S. inland points in its national development. The centers of economic development in the U.S.A. have recently been shifting to the inland territories as the cases of Chicago, Atlanta, and Dallas indicate. This trend will place the Mini Land Bridge (including Micro Land Bridge services) in more advantageous position.

(d) The compatibility of cargo with containerization. The cargo not suitable for Mini Land Bridge (railroad transportation) among the containerized shipments, including such items as heavy cargo and factory components, will continuously be carried via Panama Canal. Yet the progress of containerization technique is making an increasing number of items eligible for it.

(e) The psychological factor. The recent eagerness of the port authorities of the West Coast, the railroads, and ocean carriers in persuading and promoting the Mini Land Bridge service to the shipping public is noteworthy. These multi-party effort to promote the service may bring forth a multiplier effect in expanding the Mini Land Bridge service. The political instability of the republic of Panama gives a serious demerit to the service

via Panama Canal.

(f) Some parties consider the container ship operation via Panama Canal has reached the saturation point in the effectiveness attainable from rationalization, while others express their view that the harmful effects of oligopoly will soon set in on the rail transportation of Mini Land Bridge service and results in the increase of rates. The long standing comments that there is no backhaul cargo for Mini Land Bridge are now being answered by the recent efforts of the MLB to sell its service of return trip.

When more efforts are put in the operation of round-the-world voyage, Panama Canal may be used more often. The canal may also retain its importance as the main route for the container transport services linking the points in the east and west coasts of South America, Africa, Europe, and Australia.

- (4) Grain transport. The determinant factors for routing grain shipments through the West Coast or Panama Canal were classified into the following six elements:

(a) The trend of the trade in the Pacific Region. The recent advancement in national income of the countries of the NIES and ASEAN through their fast economic development led the citizens to more sophistication eating habit, resulting in the increased tonnage of grain imported from the U.S.A. This phenomenon will continue giving favorable impact on the grain exporting ports both on the West and the Gulf coasts.

(b) The geographical locations of grain producing area. The major part of corn, soybean, and grain sorghum for export is being dispatched from the ports on the Gulf, and this tendency will remain unchanged in the future. Most of wheat is shipped from the West Coast ports since its major producing region is closer to the

West than the other grains. The increasing demand for wheat in the Far East induces the expansion of the wheat producing land to the Western part of the U.S. and thus tends to increase its tonnages handled at the West Coast ports.

(c) The influence of the weather. The weather condition is one of the principal determinants of grain production. The drought in the Midwest in 1988 drastically decreased the harvest of corn and soybean. The lowered water level of the Mississippi made the barge operating cost and rates jump up.

(d) The innovation in storage facility technology. The route via the West coast is currently short of the railroad cars and harbor grain elevator capacity. The route from the producing area to the ports on the Gulf is provided with sufficient investment and the facilities are well arranged. The ships accommodable at the ports on the Gulf are limited up to the Panamax size, which though seem sufficient since the circumstance of the destination ports of the soybean and corn often do not have the capacity to handle more than 20 - 30 thousand tons efficiently at a time, and therefore ships of such handy size may suffice.

(e) The cost of energy. The reduction in the price of bunker oil used as fuel for the vessel makes the routing through the Gulf more advantageous, since the distance of transportation by sea is longer than in the case of the West Coast. The price increase of the oil will make the West Coast routing proportionately advantageous.

A. DETERMINANT FACTORS OF THE FUTURE TREND (CONTAINERIZED CARGO)

ROUTE FACTORS	Mini Land Bridge (MLB) ¹⁾	Via Panama Canal (PC) ²⁾
a) World trend of economy and trade	○ Economic development of NIES and ASEAN countries and increase in trade with the USA.	○ Same as MLB
b) Innovation in facility and technology	○ Expanded and improved harbor facilities, such as ICTF and DST ○ Introduction of ultra large (super Panamax) container ships	▲ Limited up to the Panamax ○ Expanded and improved harbor facilities on the East Coast
c) Relation with the U.S. inland developing points	○ The tend of developing areas in the USA toward inland regions	
d) Cargo compatibility with containers	○ Expanding range of containerizable cargo ○ Expanding range of transportable cargo on railroads	○ The size of containers accomodable in a container ship
e) Psychological factors	○ The multiplier effect of the industry related parties (ocean carriers, railroads and harbors)	▲ Uncertain feeling toward lack of political stability
f) Others	▲ The possibility of rate increases prompted by oligopoly ▲ No back-haul available ↓ ○	▲ The ocean transport rati-onarization has reached the saturation point. ○ Revival of the round-the-world voyage

Note 1) includes both Mini Land Bridge and Micro Land Bridge

2) the all-water route via Panama Canal

3) ○ = positive factor

▲ = negative factor

B. DETERMINANT FACTORS OF THE FUTURE TREND (GRAIN CARGO)

ROUTE FACTORS	Mini Land Bridge (MLB) ¹⁾	Via Panama Canal (PC) ²⁾
a) World trend of economy and trade	○ Economic development of NIES and ASEAN countries and increase in trade with the USA due to the betterment of foods consumed.	○ Same as MLB
b) Relationship with the producing areas	○ Spring wheat is mainly routed via the West Coast ports. ○ Planting areas of corn has partially shifted toward the West.	○ Most of soybean, corn, and grain sorghum are routed via the Gulf.
c) Influence of the weather	○/▲ The weather causes a great impact on the harvest.	○/▲ Same as MLB ▲ The lowered water level of the Mississippi results in the increased barge rates.
d) Investment in the facility and technology	▲ Insufficient number of railroad cars and capacity of harbor elevators ↓ ○	○ The facilities from the producing area to the harbor are well provided.
e) Energy price	▲ The railroad get to comparatively advantageous position when the bunker oil price goes up. ↓ ○	▲ The ocean carriers become less competitive when the bunker oil price goes up. ↓ ○
f) Others	▲ The emergence of alternate supplier countries. ▲ The emergence of substitute foodstuff	▲ Same as MLB ▲ Same as MLB

Note 1) Transported by railroads to the West Coast and by ship from thereon.

2) Transported by barge from the producing area to the harbor and by ship from thereon.

3) ○ = positive factor

▲ = negative factor

5. The Impact the Trans-Continental Transport Service Gives on the Transportation via Panama Canal

The review of the routes subjected to this study, as briefly described in the 1 through 4 above, indicates that the MLB is a potent alternate route of considerable capacity for the transportation service being provided via Panama Canal. There are many concrete factors conducive to such conclusion.

Nevertheless, the majority of the personnel whose opinions were surveyed through the hearing conducted this time expressed the view that the future development of the MLB will not deal a mortal blow to the transportation service via Panama Canal for the following reasons:

The cargo tonnage passed through Panama Canal in 1986 amounted to 140 million tons against 3 million tons transited through the West Coast ports onto the East Coast by the MLB service, a mere 2.1% of the total tonnage moved via the canal. Even all the 5.6 million tons of East Coast destined import traffic to the U.S.A. currently being moved by the ocean carriers should be switched to the MLB (with the MLB's penetration into the East Coast traffic at 100%), in combination with the 3 million tons currently moving on the MLB, the total tonnage of 8.6 million tons thus aggregated would be only 6.1% of the Panama Canal traffic. Therefore, in the total picture of the traffic volume moving through Panama Canal, the future growth of the MLB service even at the maximum may not be causing a mortal reduction in the traffic through the canal.

The trend of the grain traffic in the future is somewhat more difficult to anticipate because of its critical susceptibility to the varying weather conditions which considerably affect the choice of its mode of transportation. It is highly improbable that the grain transportation from the Gulf ports via Panama Canal would decreased drastically in the future. It is that the increasing demand in the NIES and other countries for the grain produced in the U.S. may tend to be routed more through the West Coast ports rather than those on the Gulf.

JICA