TABLE 1 - Cont
SUMMARY OF BERTHING CAPABILITIES OF EAST BASIN

VESSEL	BERTHS 174-176	177-179	180-181	195-198
Breakbulk				
C3-S-33a	2	2	1	4
C3-S-37c	2	2	1	4
C3-S-37d	2	2	1	4
C3-S-38a	2	2	1	4
C4-S-1a	2	2	1	3
C4-S-1qb and 1u	2	2	1	3
C4-S-58a	2	2	1	3
C4-S-65a	2	2	1	3
C4-S-66a	2	2	1	3
C4-S-69b	2	2	1	3
Seatrain				
GA and PR-class	2	2	1	3
Barge				
LASH C8-S-81b	1	1	1	2
LASH C9-S-81d	a	a	a	a
LASH Lighter	9	10	6	16
SEABEE C8-S-82a	a	a	a	a
SEABEE barge	6	7	4	11
RORO				
Comet	d,i,j	d,o	d,o	d,i,j
C7-S-95a/Maine-class	1	b	b	2
Ponce-class	h	b,h	b,h	h
Great Land-class	h	b,h	b,h	h
Cygnus/Pilot-class	1	b	b	3
Meteor	d,i,j	d,o	d,o	d,i,j
AmEagle/Condor	i,j	b	b	i,j
MV Ambassador	d	d	d	d
FSS-class	1,i	b	b,c	2,i
Cape D-class	i,j	b	b	i,j
Cape H-class	a	a,b	a,b	2,i
Container				
C6-S-1w	1	2,e	1,e	3,e
C7-S-68e	1	1,e	1,e	3,e
C8-S-85c	1	1,e	1,e	2,e
Combination				
C5-S-78a	2	2,e	1,e	3,e
C5-S-37e	2	2,e	1,e	3,e

a = maximum vessel draft limited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
e = no container-handling equipment
f = inadequate berth depth, adequate anchorage depth
g = inadequate channel depth
h = no shore-based ramps available
i = insufficient ramp clearance at low tide
j = insufficient ramp clearance at high tide
k = excessive ramp angle at low tide
m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.

TABLE 1 - Cont
SUMMARY OF BERTHING CAPABILITIES OF TERMINAL ISLAND

VESSEL	*BERTHS*					
	206-209	212-214	215-216	217-221	222-224	227
Breakbulk						
C3-S-33a	3	2	1	1	1	c
C3-S-37c	3	2	1	1	1	c
C3-S-37d	3	2	1	1	1	c
C3-S-38a	3	2	1	1	1	c
C3-S-1a	3	2	1	1	1	c
C4-S-1qb and 1u	3	2	1	1	1	c
C4-S-58a	3	2	1	1	1	c
C4-S-65a	3	2	1	1	1	c
C4-S-66a	3	2	1	1	1	c
C4-S-69b	3	1	1	1	1	c
Seatrain						
GA and PR-class	3	2	1	1	1	c
Barge						
LASH C8-S-81b	2	1	c	1	1	c
LASH C9-S-81d	2	1	c	1	1	c
LASH Lighter	14	8	5	6	6	1
SEABEE C8-S-82a	2	1	c	1	1	c
SEABEE barge	10	6	4	4	4	c
RORO						
Comet	d,i,j	d,i,j	d,i,j	d,i,j	d,o	c,d
C7-S-95a/Maine-class	2	1	1	1	b	c
Ponce-class	h	h	h	h	b,h	c,h
Great Land-class	h	h	h	h	b,h	c,h
Cygnus/Pilot-class	3	1	1	1	b	c
Meteor	d,i,j	d,i,j	d,i,j	d,i,j	d,o	c,d
AmEagle/Condor	i,j	i,j	i,j	i,j	b	c
MV Ambassador	d	d	d	d	d	c,d
FSS-class	2,i	1,i	c	c	b,c	c
Cape D-class	i,j	i,j	i,j	i,j	b	c
Cape H-class	2,i	1,i	1,i	1,i	b	c
Container						
C6-S-1w	2	1	1	1	1,e	c,e
C7-S-68e	2	1	1	1	1,e	c,e
C8-S-85c	2	1	c	1	1,e	c,e
Combination						
C5-S-78a	3	1	1	1	1,e	c,e
C5-S-37e	3	1	1	1	1,e	c,e

a = maximum vessel draft llimited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
e = no container-handling equipment
f = inadequate berth depth, adequate anchorage depth
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h = no shore-based ramps available
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k = excessive ramp angle at low tide
m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.

TABLE 1 - Cont
SUMMARY OF BERTHING CAPABILITIES OF TERMINAL ISLAND

	BERTHS	
VESSEL	228-232	233-236
Breakbulk		
C3-S-33a	5	2
C3-S-37c	4	2
C3-S-37d	4	2
C3-S-38a	4	2
C4-S-1a	4	2
C4-S-1qb and 1u	4	2
C4-S-58a	4	2
C4-S-65a	4	2
C4-S-66a	4	2
C-S-69b	4	2
Seatrain		
GA and PR-class	4	2
Barge		
LASH C8-S-81b	3	1
LASH C9-S-81d	2	a
LASH lighter	18	10
SAEBEE C8-S-82a	2	a
SEABEE barge	12	7
RORO		
Comet	d,i,j	d,i,j
C7-S-95a/Maine-class	3	1
Ponce-class	h	h
Great Land-class	h	h
Cygnus/Pilot-class	3	2
Meteor	d,i,j	d,i,j
AmEagle/Condor	i,j	i,j
MV Ambassador	d	d
FSS-class	2,i	1,i
Cape D-class	i,j	i,j
Cape H-class	3,i	1,i
Container		
C6-S-1w	3	2
C7-S-68e	3	1
C8-S-85c	2	1
Combination		
C5-S-78a	4	2
C5-S-37e	4	2

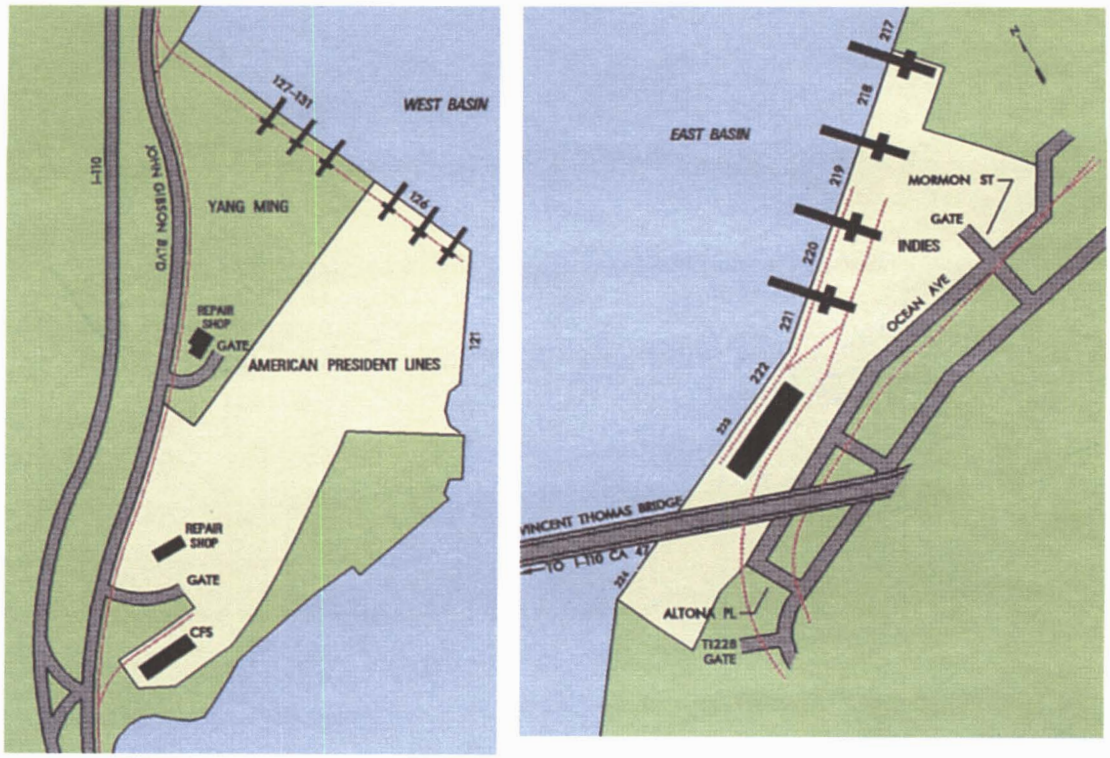
a = maximum vessel draft limited to berth depth	h = no shore-based ramps available
b = inadequate apron width	i = insufficient ramp clearance at low tide
c = inadequate berth length	j = insufficient ramp clearance at high tide
d = no straight stern-ramp facilities	k = excessive ramp angle at low tide
e = no container-handling equipment	m = excessive ramp angle at high tide
f = inadequate berth depth, adequate anchorage depth	n = parallel ramp operation only
g = inadequate channel width	o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.

III. APPLICATION

GENERAL

This section of the report will evaluate the port's throughput capability for deploying a notional mechanized infantry division primarily using FSS vessels. The 1988 revision for the Planning Orders Digest, issued by MARAD, provided agreements for the military to use the Port of Los Angeles. The agreements referenced the entire American President Lines Terminal. The upcoming revision will not likely reference any part of the Port of Los Angeles.



Facilities in the July 1988 Planning Order Digest

If the military needs to deploy through the Port of Los Angeles, it will most likely use the Indies Terminal. The American President Lines Terminal is very busy, and will not likely support the disruption of commercial businesses. This report assumes that all of the Indies Terminal is available for military operations.

In addition to the Indies Terminal, this analysis assumes the military will negotiate to use the Yusen Terminal. Although the Yusen Terminal is very busy with commercial cargo, its adjacent railyard, FSS capability, and proximity to the Indies Terminal make it a good choice.

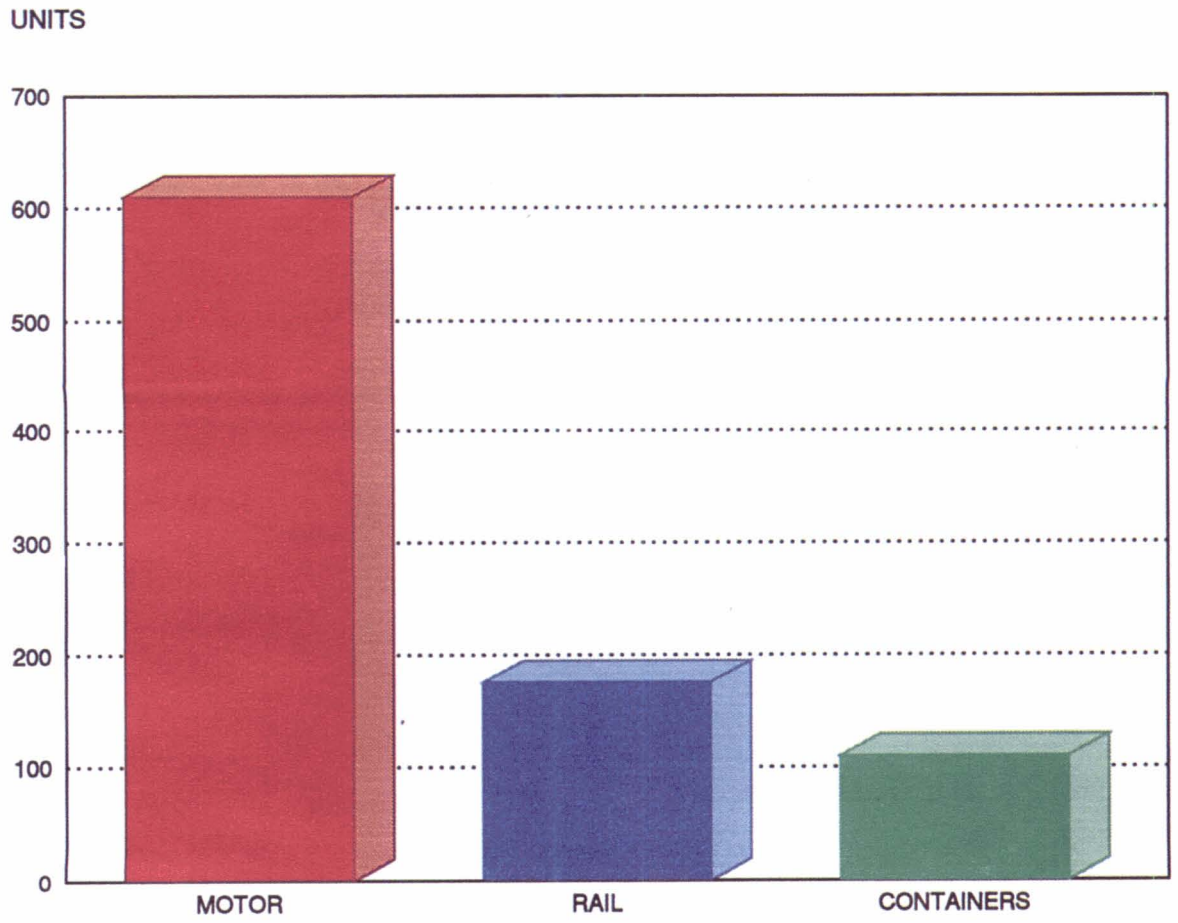
REQUIREMENTS

The most likely requirement for the Port of Los Angeles is to deploy a notional mechanized infantry division in 6 days of reception and throughput. The division has to move about 7,800 vehicles and 660 containers. The movement to the port will require 1,055 (176 per day) railcars using the convoy/rail option. Under this option, about 3,650 (610 per day) roadable vehicles would be driven and about 2,320 (387 per day) would be towed.

MECHANIZED INFANTRY DIVISION

Total Equipment	
Volume	274,518 MTON
Weight	95,010 STON
Area	1,422,844 SQ FT
Vehicles	7,800
Containers	600

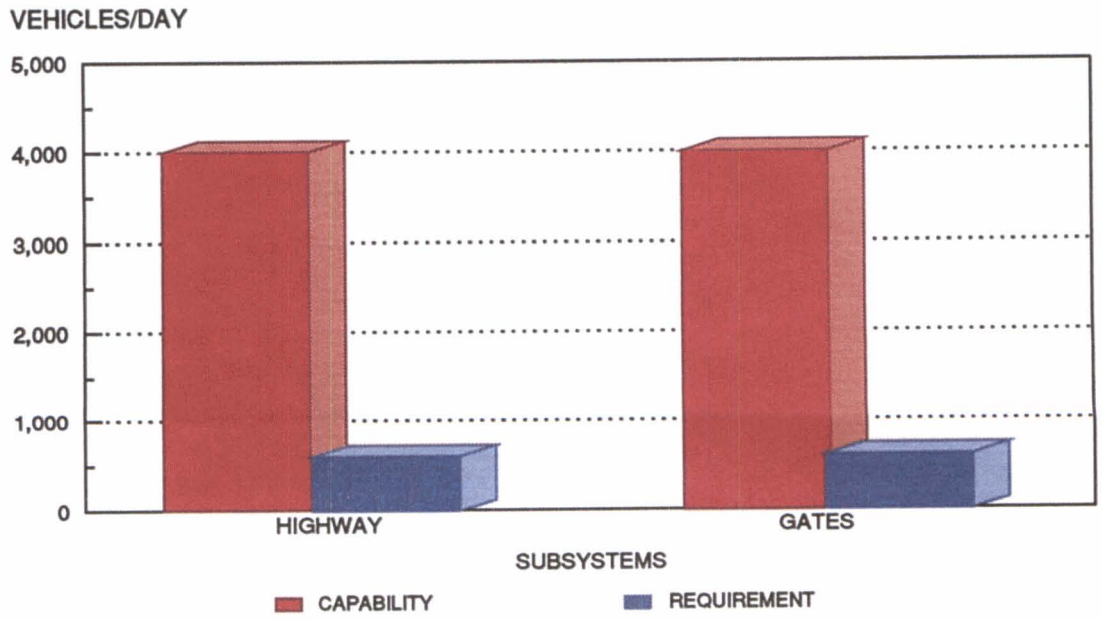
DAILY REQUIREMENTS



TERMINAL HANDLING

Highway. Vehicles and containers on chassis would access the terminals through the gates at Morman and New Dock Streets. The access roads and gates can handle at least 4,000 vehicles per day.

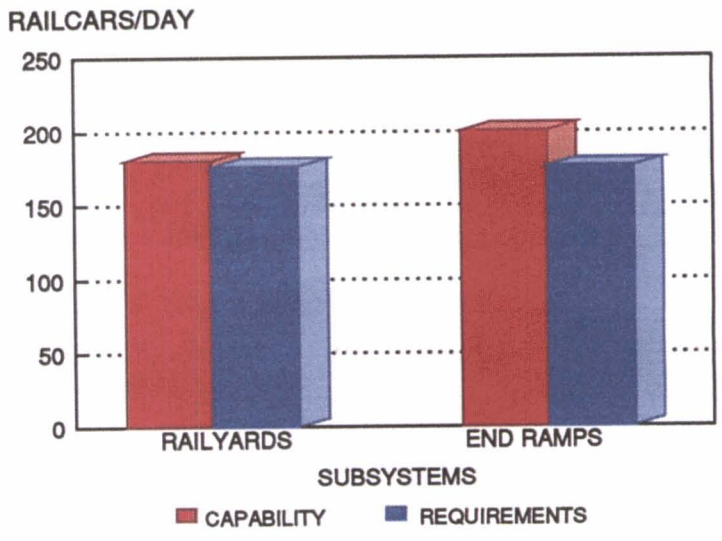
HIGHWAY INPROCESSING CAPABILITY



Rail. The Indies Terminal can receive about 80 railcars per day of military equipment. The railyard inland of the Yusen Terminal can recieve about 100 railcars without disrupting the concurrent commercial operations. This is sufficient to meet the requirement.

Trackage at the Indies Terminal can only support offloading five railcars at a time, unless apron space is used. Three additional portable ramps (each supporting the offloading of 15 railcars) at the railyard inland of the Yusen Terminal will satisfy the requirement. These four ramps will have the capability to offload 200 railcars per day.

RAIL INPROCESSING AND HANDLING CAPABILITY

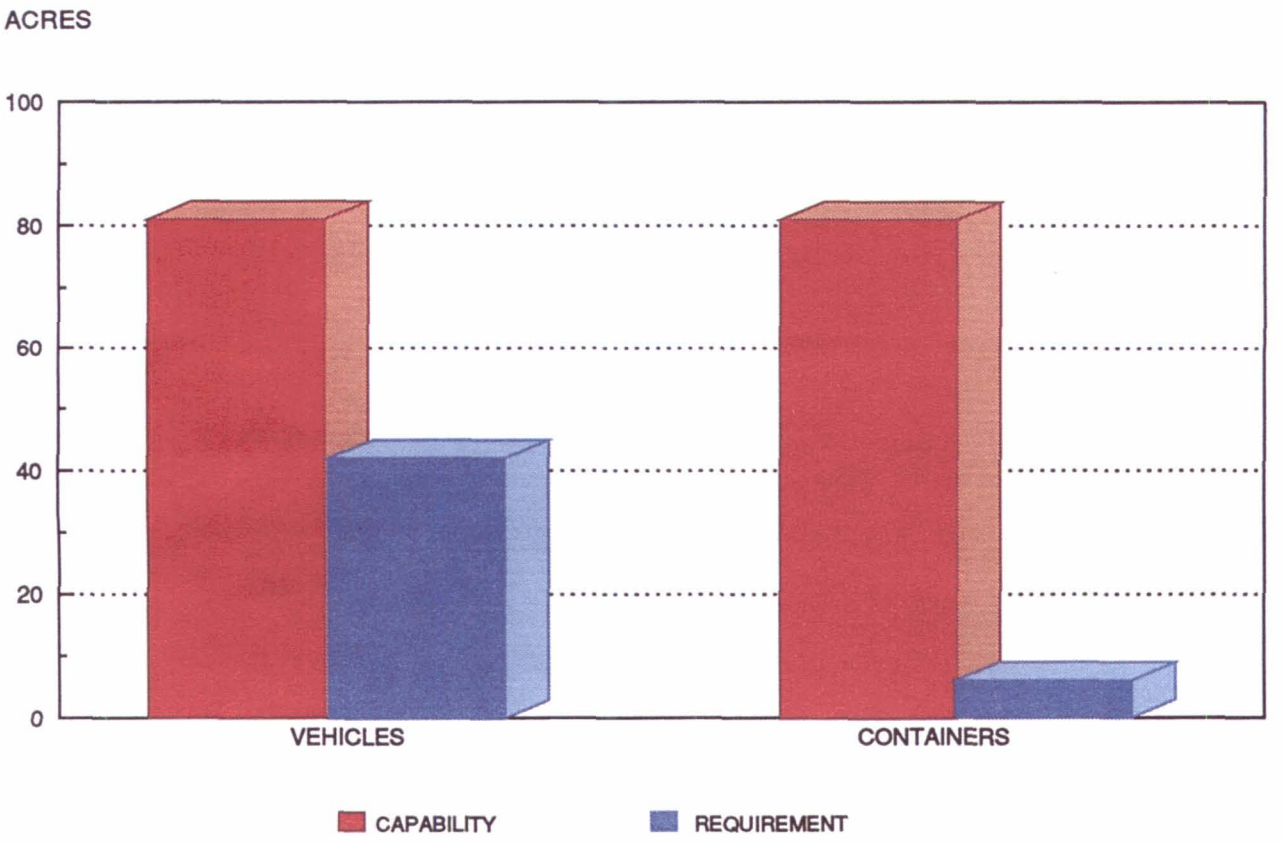


STAGING

This analysis assumes that current downsizing continues, and that nine FSS-sized ships will deploy an entire notional mechanized infantry division. Three ships will depart every 2 days. Because of this, the staging requirement is to support three sustained loading operations.

Although an FSS load of cargo can be staged and loaded on 10 acres, 16 acres are required for sustained loading operations. Of these 16 acres, about 2 acres are required for staging the 73 containers for each FSS. The three simultaneous shiploading operations will require 48 acres of open staging, of which about 6 acres are dedicated to containers. There are 162 acres of open staging that could support military operations at the two terminals. This is enough staging area for the deployment.

OPEN STAGING CAPABILITY



SHIPPING

Although this analysis assumes that only nine FSS-sized ships can deploy the notional mechanized infantry division, the table below provides ship quantities for the current division size. The number of ships required depends on the shipping mix selected. The best ship mix would consist of all eight FSS ships, plus two Cape H RORO ships.

UNIT MOVEMENT REQUIREMENTS, MECHANIZED DIVISION

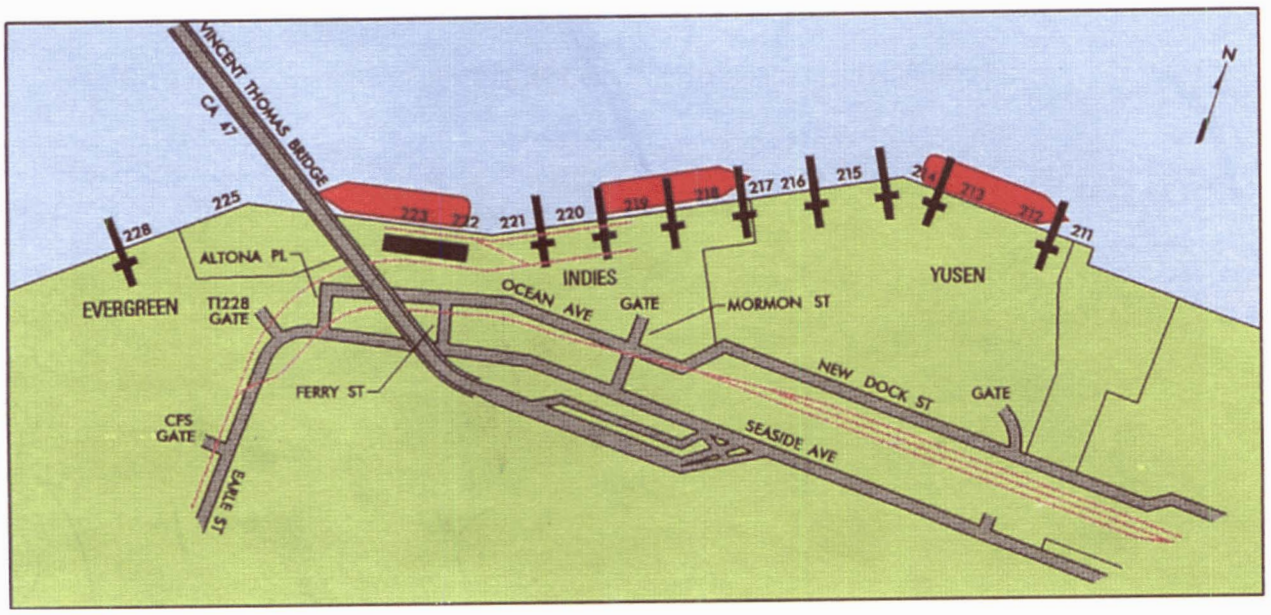
LOADING CONDITION/ SAMPLE SHIP MIX	VESSEL TYPES			
	FSS (RORO/COMB)	CAPE H (RORO/COMB)	C3/C4 (BREAKBULK)	C6/C7/C8 (CONTAINER)
Minimum Containerization				
All FSS*	8.00	1.90		
FSS and Cape H	6.64	3.00		
All Breakbulk			37.70	
Maximum Containerization				
FSS and Container	7.90			2.00
FSS, Cape H, and Container	4.62	3.00		2.00
Breakbulk and Container			29.58	2.00

*Only eight FSS are available. Unit shipping requirements exceed the capacity of these eight vessels. Other vessel types are required to make up the FSS shortfall (Cape H).

Legend:
RORO - roll on/roll off
FSS - fast sealift ship

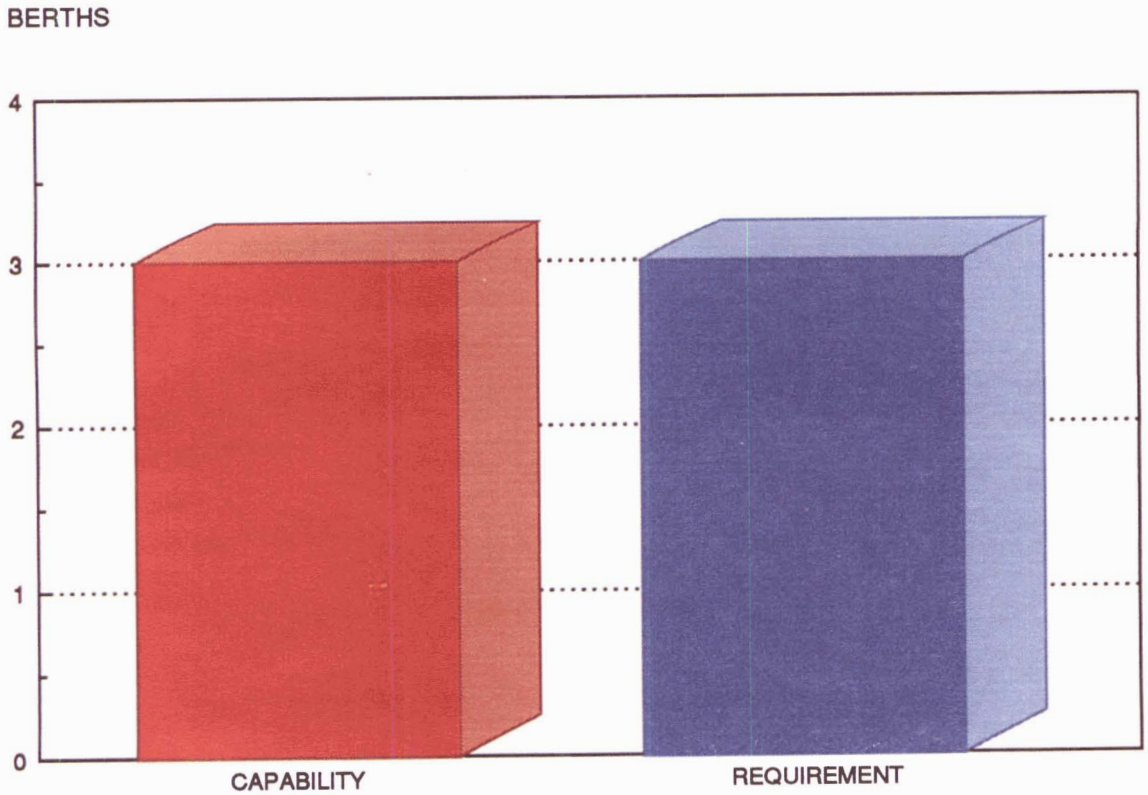
Source: MTMCTEA Report OA 90-4f-22, Deployment Planning Guide, Aug 91.

The berthing capability at the two terminals is marginal for three simultaneous FSS berthings. The apron height of 15 feet above MLW might prevent RORO operations at low tide.



FSS Berthing

FSS SHIPPING CAPABILITY



SUMMARY

The Indies and Yusen Terminals have adequate characteristics to support the deployment of a division.

RECOMMENDATION

We recommend negotiating for the use of Indies and Yusen Terminals and three spurs of the UP railyard inland of the Yusen Terminal.

MAJOR PORT CMD

MAJOR PORT CMD

PORTS OF OAKLAND
AND
1302D MAJOR PORT COMMAND
OAKLAND, CALIFORNIA

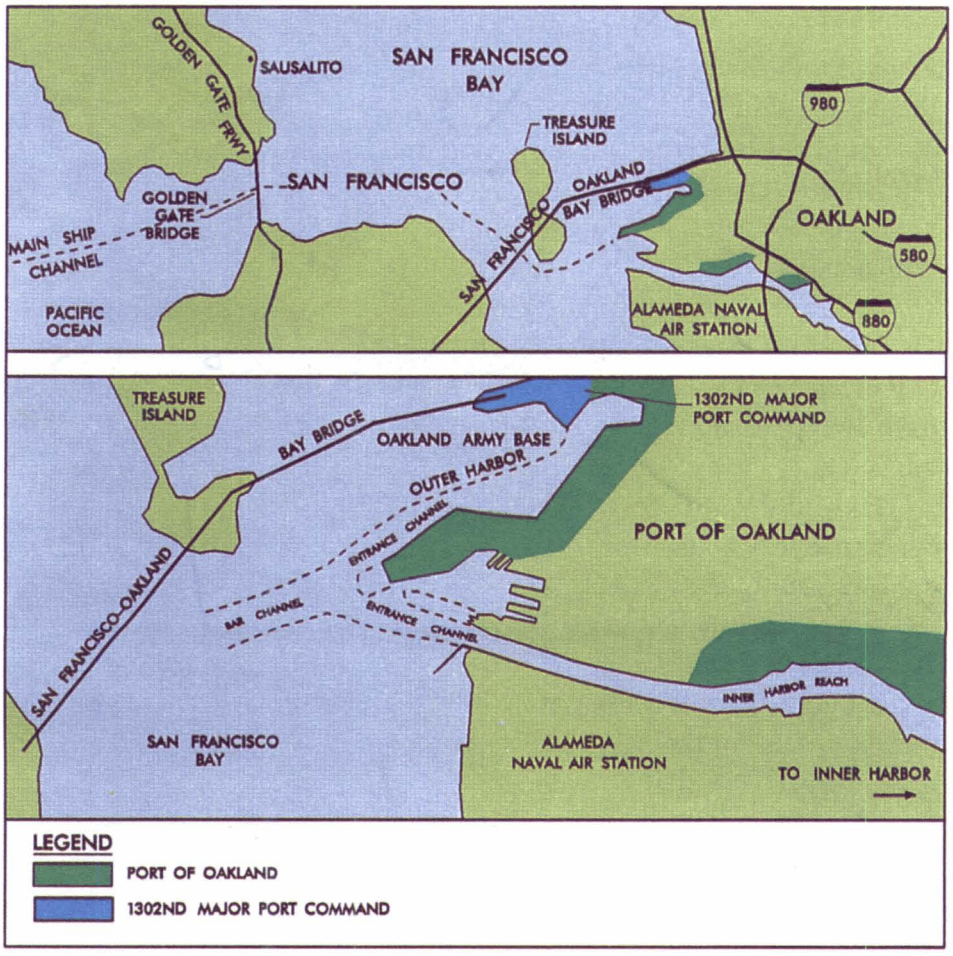
I. GENERAL DATA

TRANSPORTATION ACCESS

Water

The Ports of Oakland and 1302d Major Port Command (MPC) are on the eastern shore of San Francisco Bay. The Port of Oakland consists of the outer, middle, and inner harbors. MPC is next to the Port of Oakland, on the outer harbor. Access to these ports is via a strait called the "Golden Gate." The Golden Gate varies in width from 1 to 3 miles, has depths up to 350 feet, and is the connection between the Pacific Ocean and San Francisco Bay.

Main Ship Channel provides access to the Golden Gate from the Pacific Ocean. It has a project depth of 56 feet mean low water (MLW) and a width of 2,000 feet. Generally, the depth through the bay is at least 50 feet MLW until the Bar Channel entrance to the Port of Oakland. Bar Channel, Outer Harbor Entrance Channel, and Inner Harbor Entrance Channel to Howard Terminal are at least 400 feet wide and have a depth of 38 feet MLW. Inner Harbor Channel, leading to Ninth Avenue Terminal, is 35 feet deep at MLW.



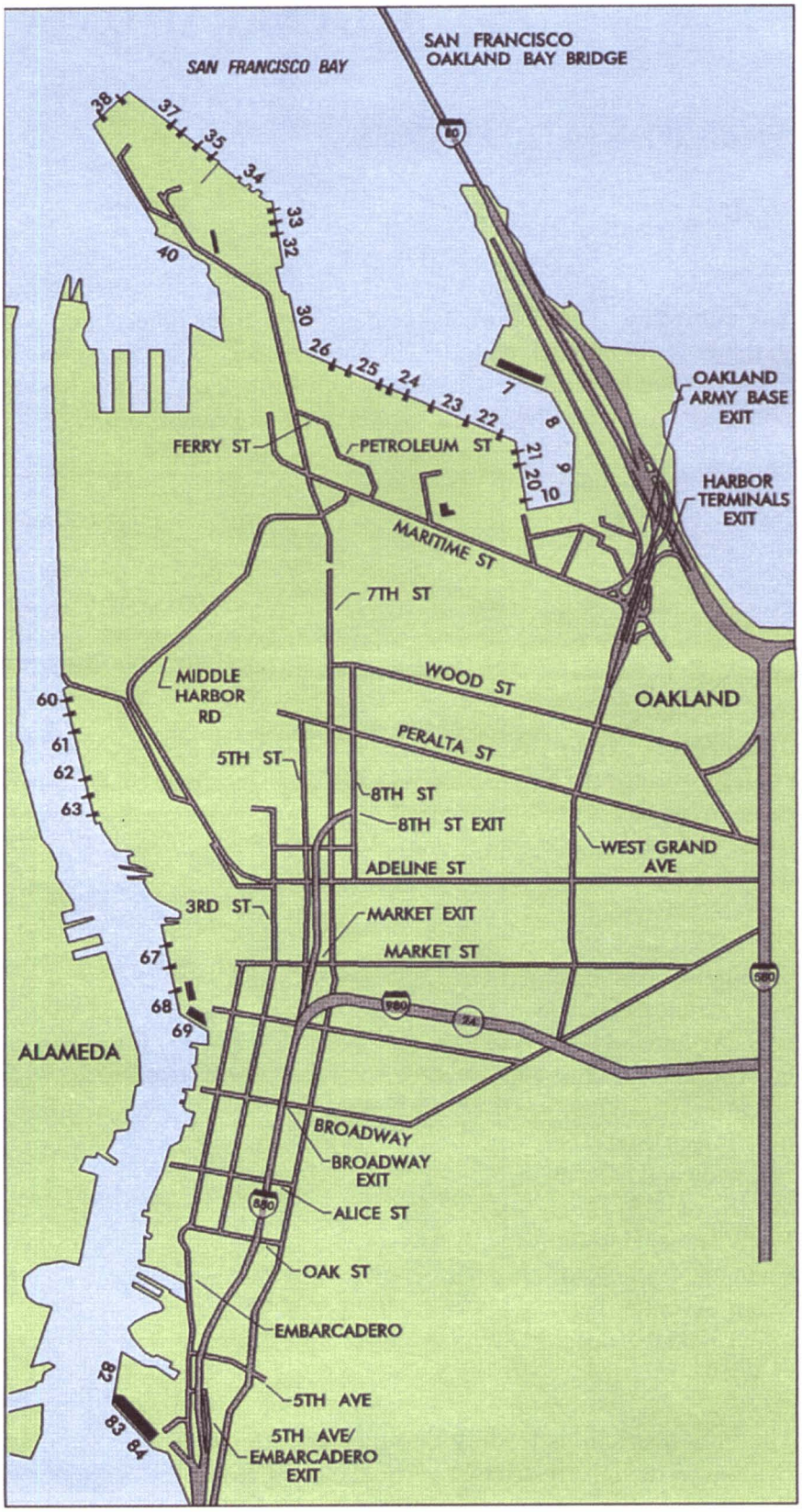
Water Access

The only restrictions leading into the port are the Golden Gate and San Francisco-Oakland Bay Bridges. The most restrictive vertical clearance beneath either bridge is 174 feet mean high water (MHW) (pier A). The most restrictive width is 1,072 feet (pier B-C). The outer and inner harbors have ship turning basins. The middle harbor uses the inner harbor's turning basin.

Highway

Interstate Routes 80, 580, 880, and 980 provide access to the general area of the ports. MPC is accessible via Burma Road off I-80. The Port of Oakland Outer Harbor Terminals are accessible via Maritime Street off I-80. Seventh Street accesses the Seventh Street Terminals. The entrances to American President Lines (APL) Terminal are off Middle Harbor Road, and Market Street accesses Howard Terminal. The Ninth Avenue Terminal is accessible via Embarcadero.

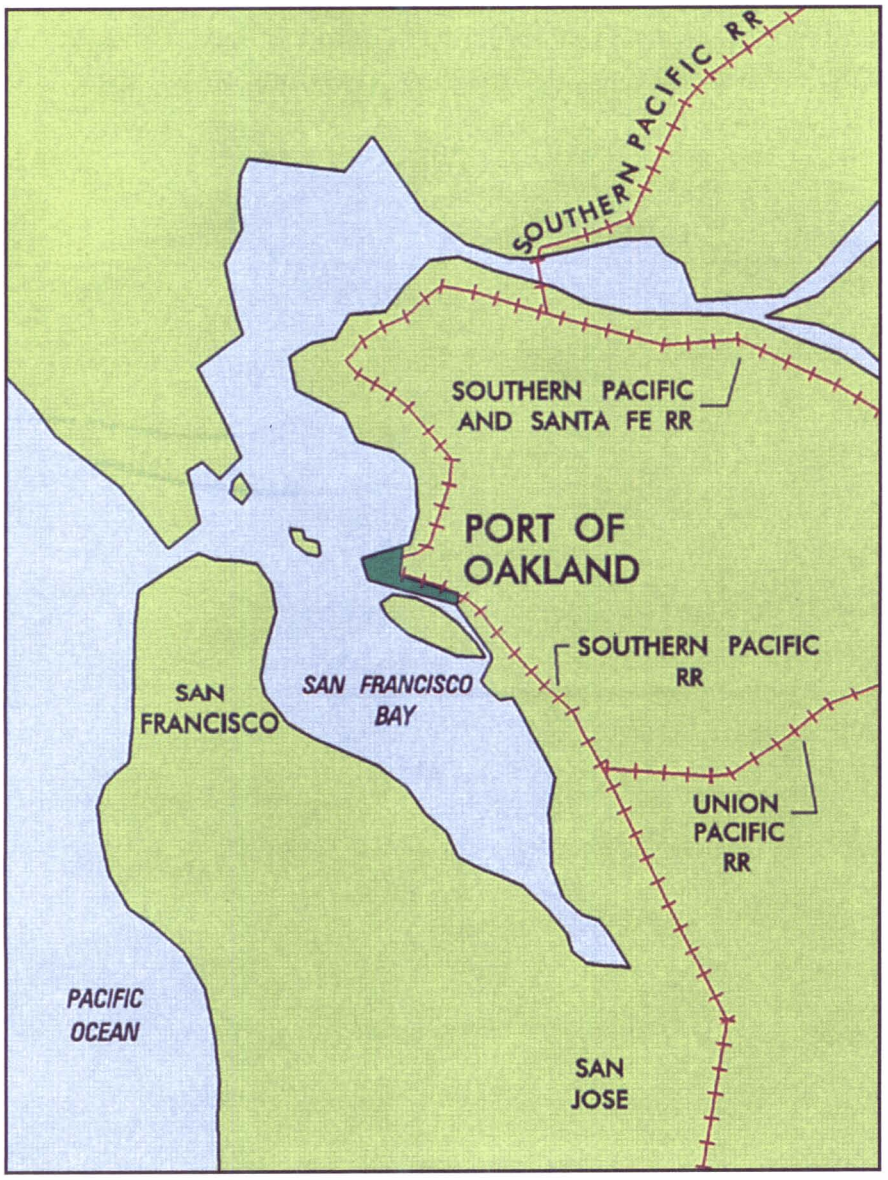
The number of lanes on each of these access roads varies from two to four. Heavy traffic congestion exists in the Oakland area, especially during the peak hours. Any transport configuration that exceeds 14 feet in height and 102 inches in width is considered to be an oversize transport item for the State of California.



Highway Access

Rail

The Atchison, Topeka, and Santa Fe (ATSF) Railway; Southern Pacific Transportation Company (SP); and Union Pacific Railroad (UP) provide rail services to the ports. SP and the Oakland Terminal Railway (OTR) provide switching operations to MPC. The UP, SP, and OTR provide the switching operations for the Port of Oakland. SP and UP have railyards near the ports. ATSF has a railyard in Richmond, California. MPC has two railyards on Oakland Army Base, which is near the ports. Neither port has clearance restrictions. Bilevel and trilevel operations occur at the Port of Oakland. MPC conducts bilevel operations.

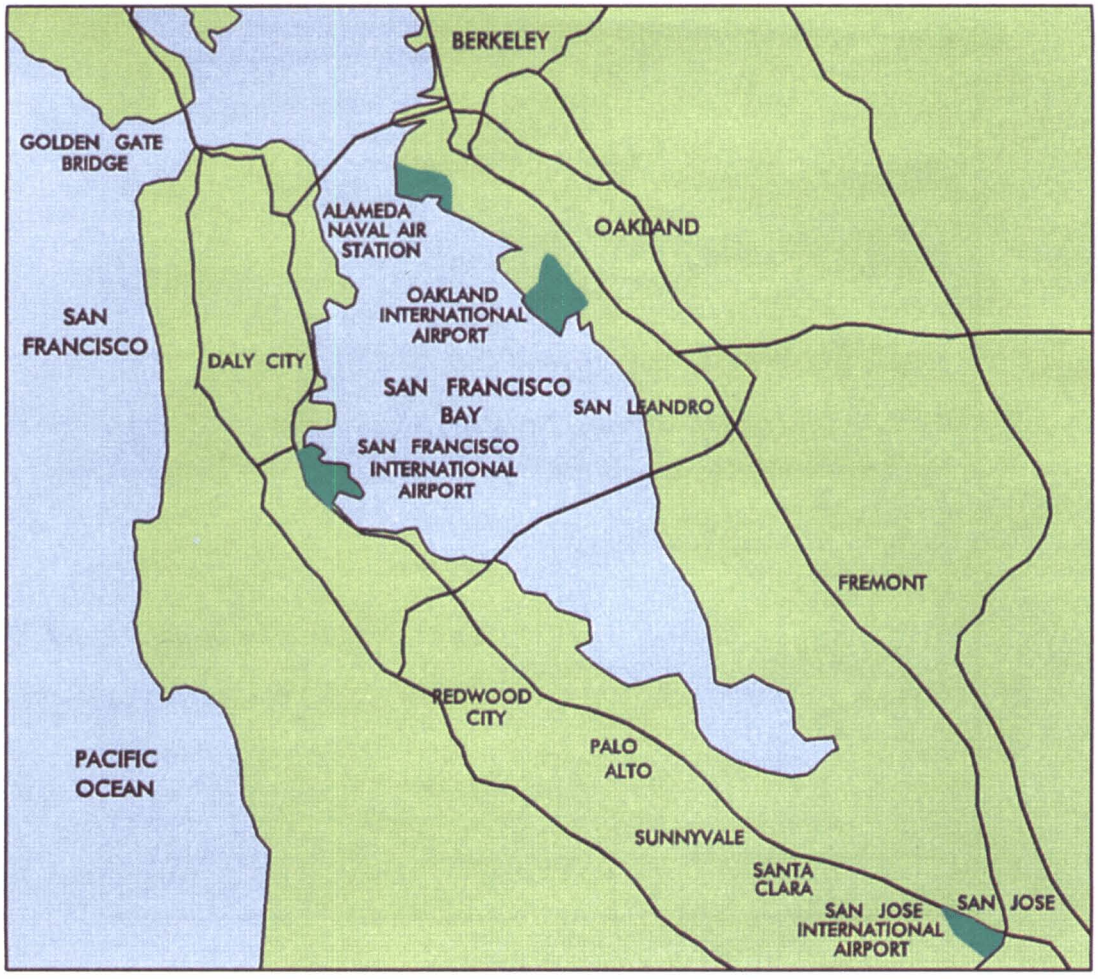


Rail Access

Air

Three commercial airports are within the Port of Oakland and MPC area. They are San Francisco International, Oakland International, and San Jose International. San Francisco International is about 17 miles southwest of the ports and has four asphalt runways, the longest of which is 11,870 feet long by 200 feet wide. Oakland International is 8 miles southeast of the ports and has three asphalt runways, the longest of which is about 10,000 feet long by 150 feet wide. San Jose International is 40 miles southeast of the ports and has two asphalt runways, the longest of which is 8,900 feet long (7,900 feet, using displaced threshold) by 200 feet wide.

The Alameda Naval Air Station, which is the nearest military airfield, is about 5 miles south of the ports. It has two asphalt runways, the longest of which is 8,000 feet long by 200 feet wide. This airfield is listed on the Base Realignment and Closure (BRAC) list. Travis Air Force Base is about 40 miles northeast of the ports and has two concrete runways. Both runways are about 11,000 feet long by 300 feet wide.



Air Access

PORT FACILITIES

Berthing

The Port of Oakland is a multicargo port with a specialization in containers. The port consists of several marginal wharf terminals. Wharf construction is generally concrete decking or concrete relieving platform supported by concrete piling extending from a concrete or steel sheet pile bulkhead with solid fill. All wharves have an asphalt surface and a timber or timber and rubber fendering system. Lighting is available for night operations.

MPC is a multicargo terminal consisting of a marginal wharf. Wharf construction is generally concrete decking extending from a concrete bulkhead with solid fill and asphalt surface. Concrete piling supports the decking. The berth is fronted by timber fender piles. The Port of Oakland is improving some of the wharves to allow dissipation of shock caused by earthquakes. Lighting is available for night operations.

Figure 1 is a vicinity map of the Port of Oakland and MPC. Figures 2 through 7 are aerial views of the facilities and include tables that identify the berth characteristics of the ports.

Shock Dissipation Improvements at Matson Terminal

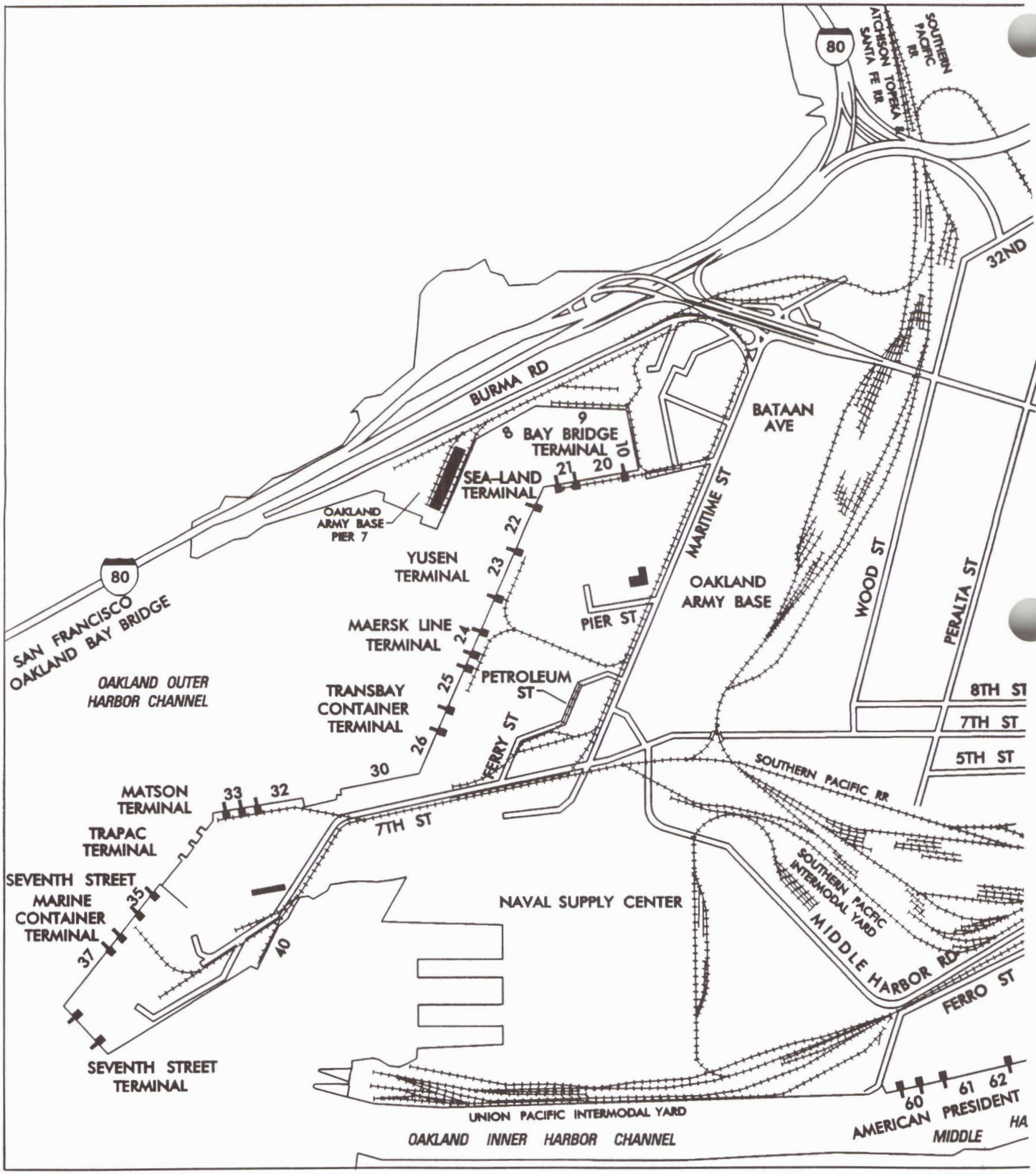
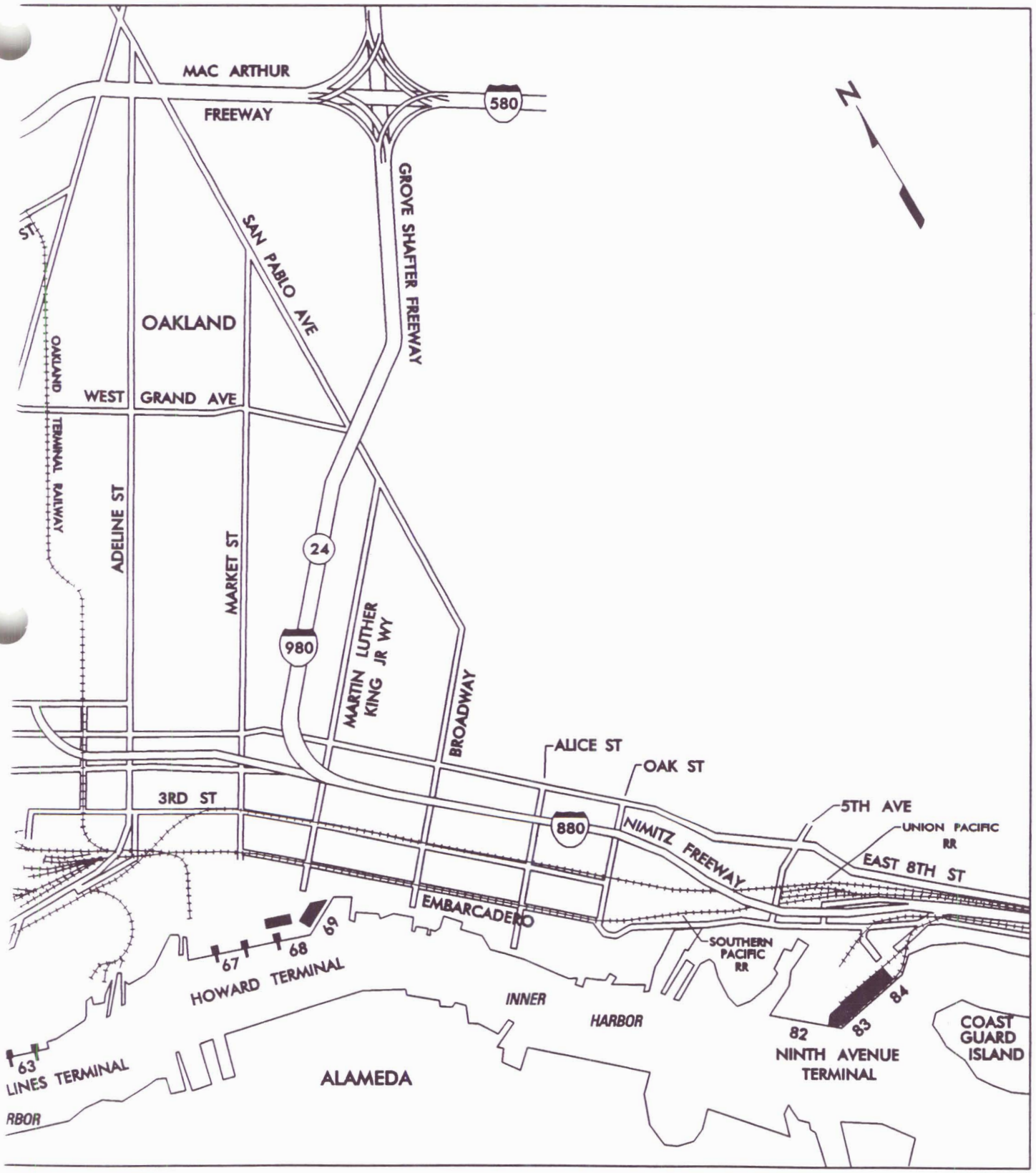


Figure 1. Vicinity map of Port of Oakla



and 1302d Major Port Command (MPC).

Figure 2. Port terminals.

BERTH CHARACTERISTICS OF SEALAND, YUSEN, MAERSK, AND TCT

CHARACTERISTICS	BERTHS				
	22	20 - 21	23	24	25 - 26
Length (ft)	886	1,170	900	1,046	1,353
Depth alongside at MLW (ft)	40	40	40	40	35
Deck strength (psf)	600	600	1,000	1,000	1,000
Apron width (ft)	Open	Open	Open	Open	Open
Apron height above MLW (ft)	14	14	14	14	14
Number of container cranes	1	3	2	3	2
Number of wharf cranes	0	0	0	0	0
Apron lighting	Yes	Yes	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	No	No	No
Apron length served by rail (ft)	0	0	900	1,046	0

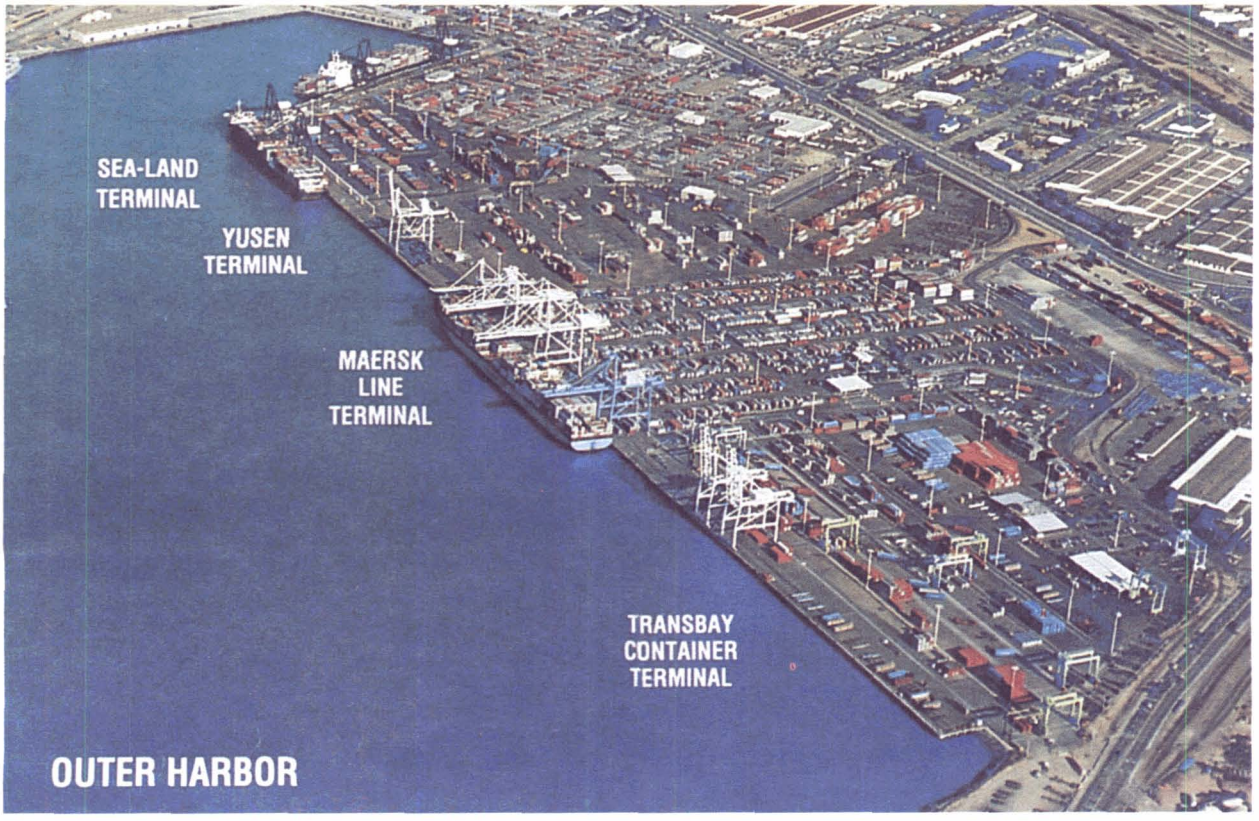


Figure 3. Outer harbor port facilities.

BERTH CHARACTERISTICS OF MATSON, TRAPAC, AND SEVENTH MCT

CHARACTERISTICS	BERTHS				
	32 - 33	34	35	37	38
Length (ft)	1,532	720	900	1,082	862
Depth alongside at MLW (ft)	35	35	39	40	40
Deck strength (psf)	1,000	1,000	1,000	1,000	1,000
Apron width (ft)	Open	Open	Open	Open	Open
Apron height above MLW (ft)	14	14	15	14	14
Number of container cranes	3	0	2	2	2
Number of wharf cranes	0	0	0	0	0
Apron lighting	Yes	Yes	Yes	Yes	Yes
Straight-stern RORO facilities	No	No	No	No	No
Apron length served by rail (ft)	1,532	0	0	0	0

Figure 4. Seventh Street port facilities.

BERTH CHARACTERISTICS OF APL

CHARACTERISTICS	BERTHS 60-63
Length (ft)	2,743
Depth alongside at MLW (ft)	38
Deck strength (psf)	1,100
Apron width (ft)	Open
Apron height above MLW (ft)	14
Number of container cranes	5
Number of wharf cranes	0
Apron lighting	Yes
Straight-stern RORO facilities	No
Apron length served by rail (ft)	0

Figure 5. APL port facilities.

BERTH CHARACTERISTICS OF HOWARD

CHARACTERISTICS	BERTHS	
	67-68	69
Length (ft)	1,712	566
Depth alongside at MLW (ft)	40	35
Deck strength (psf)	1,000	600
Apron width (ft)	Open	32
Apron height above MLW (ft)	14	14
Number of container cranes	3	0
Number of wharf cranes	0	0
Apron lighting	Yes	Yes
Straight-stern RORO facilities	No	No
Apron length served by rail (ft)	1,712	0

Figure 6. Howard port facilities.

BERTH CHARACTERISTICS OF BAY BRIDGE TERMINAL, NINTH AVENUE, AND 1302D MAJOR PORT COMMAND

CHARACTERISTICS	BERTHS					
	8	9	10	83 - 84	82	7 PIER
Length (ft)	1,000	1,200	839	1,115	950	1,459
Depth alongside at MLW (ft)	35	35	35	35	35	35
Deck strength (psf)	400[1]	600[2]	600	600	600	600[3]
Apron width (ft)	83	Open	Open	30	Open	Open
Apron height above MLW (ft)	14	14	14	14	14	14
Number of container cranes	0	0	0	0	0	0
Number of wharf cranes	0	0	0	0	0	1
Apron lighting	Yes	Yes	Yes	Yes	Yes	Yes
Straight-stern RORO facilities	No	Yes	Yes	No	No	No
Apron length served by rail (ft)	0	0	0	1,115	0	1,459

[1] 1,000 psf from water's edge to 14 ft from water's edge.
[2] 1,000 psf from water's edge to 34 ft from water's edge.
[3] 1,000 psf from water's edge to 46 ft from water's edge.

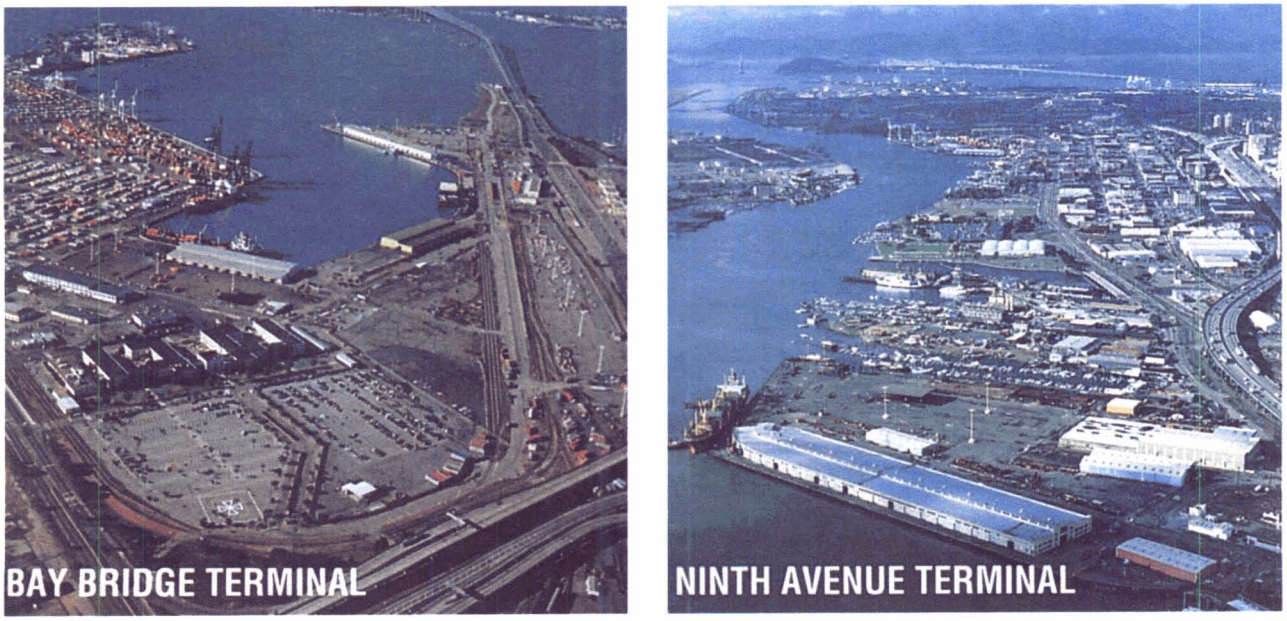


Figure 7. Bay Bridge, Ninth, and 1302d Port facilities.

Staging

OPEN STAGING

The Port of Oakland has about 375 acres available for open staging. All of this acreage is paved and is used mainly for storage of containers and general cargo. This chart shows the distribution of open staging acreage for each terminal.

The Port of Oakland does not identify any areas suitable for landing helicopters and preparing them for shipment.

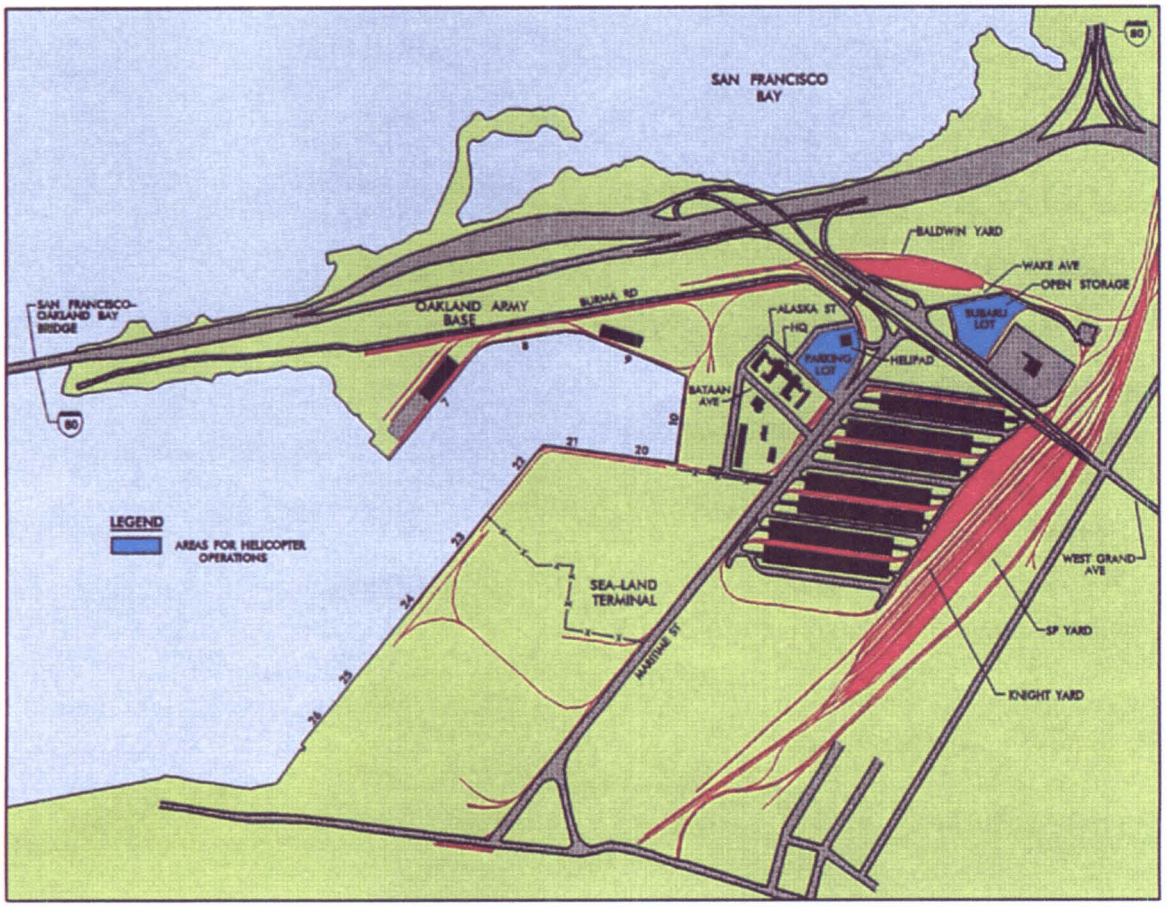
MPC has about 21 acres of open staging for wharf 7. If the Port of Oakland is not using the Subaru and Bay Bridge Terminal open storage lots, another 34 acres are available for use by MPC.

PORT OF OAKLAND
OPEN STAGING DISTRIBUTION

TERMINAL	BERTHS	ACREAGE
Bay Bridge	8-10	43
Sea-Land	20-22	48
Yusen	23	32
Maersk	24	32
TCT	25-26	21
Matson	32-34	46
TRAPAC	35	10
MCT	37-38	28
Berth 40	40	3
APL	60-63	62
Howard	67-69	36
Ninth	82-84	13

Matson Terminal Open Staging Area

MPC identifies the Post Headquarters parking lot as an area for landing helicopters and preparing them for shipment (about 1 acre). This area has landing and obstruction lights; however, it has no adjacent covered storage. Another potential helicopter operations site is the Subaru storage lot. This area was used for landing and preparing Medevac helicopters during Operations Desert Shield and Storm.



Potential Areas for Landing and Preparation of Helicopters

COVERED STAGING

The Port of Oakland has three transit sheds and three container freight stations that provide about 475,180 square feet of covered storage.

MPC has a container freight station with three warehouses and one transit building at wharf 7, opened in November 1993. These four buildings will provide about 763,870 square feet of covered storage.

Rail

1302d Major Port Command-Owned Knight Railyard

Rail trackage links the commercial railyards to the apron tracks and storage sheds at the Port of Oakland, except for those at the APL container freight station. An apron track is along the Ninth, Howard, Matson, Maersk, and berth 40 terminals.

The port has no railyards; however, the nearby commercial railyards (UP and SP) have a combined total of more than 228,800 feet of storage track. Also, ATSF has a railyard 10 to 15 miles north of the port, at Richmond, with 6,000 linear feet of track.

Rail trackage links the commercial railyards to the MPC storage tracks, apron tracks, and storage sheds. MPC has two railyards (fig 1) totaling nearly 48,270 linear feet of track as well as access to the commercial railyards cited above.

Highway

The Port of Oakland has more than 15 miles of paved roadways. In general, these roads are four laned. These roads do not have any clearance restrictions. A gate leads into each terminal of the port. The number of lanes at the gates varies from 2 to 13.

Gate onto Sea-Land Terminal

The Port of Oakland has 25 truck scales. The following chart shows the distribution of these scales.

Burma Road, a two-lane road with no clearance restrictions, provides access to MPC. Truck scales are available.

PORT OF OAKLAND TRUCK SCALE DISTRIBUTION

TERMINAL	NUMBER OF SCALES
Matson	2
TRAPAC	2
7th St	2
Howard	4
Sea-Land	3
Yusen	4
Maersk	2
TCT	3
APL	3

Truck Scales at the 1302d Major Port Command

Unloading/Loading Positions

RAMPS

Railcar offloading operations for the Port of Oakland take place at the commercial railyards near the port. UP has one permanent end ramp and three portable end ramps. The permanent end ramp is at the railyard between Ferro Street and El Dorado, off Middle Harbor Road. The portable ramps are at the automobile facility on Middle Harbor Road. SP has one portable end ramp at its railyard.

UP Intermodal Yard Portable Rail End Ramp

The Port of Oakland has two portable end ramps for offloading trucks or truck tractor/semitrailer combinations.

MPC has a permanent dual offloading end ramp at the wharf 7 open storage area and two steel portable end ramps for rail operations (figs 8 and 9). One of these end ramps is self-propelled. No end ramps are readily available at MPC for offloading trucks or truck tractor/semitrailer combinations.

DOCKS

All storage sheds at the Port of Oakland have truck-level docks, providing a total of 218 handling positions. The Maersk, Ninth Avenue, and Matson Terminals have railcar-level platforms, for a total of 23 handling positions. The Ninth Avenue Terminal also has 10 surface-level rail handling positions.

All storage sheds at MPC have railcar and truck docks. This facility has 65 truck handling positions and 48 surface-level railcar handling positions.

Docks Between Buildings S806 and S807, Oakland Army Base
(eastward view)

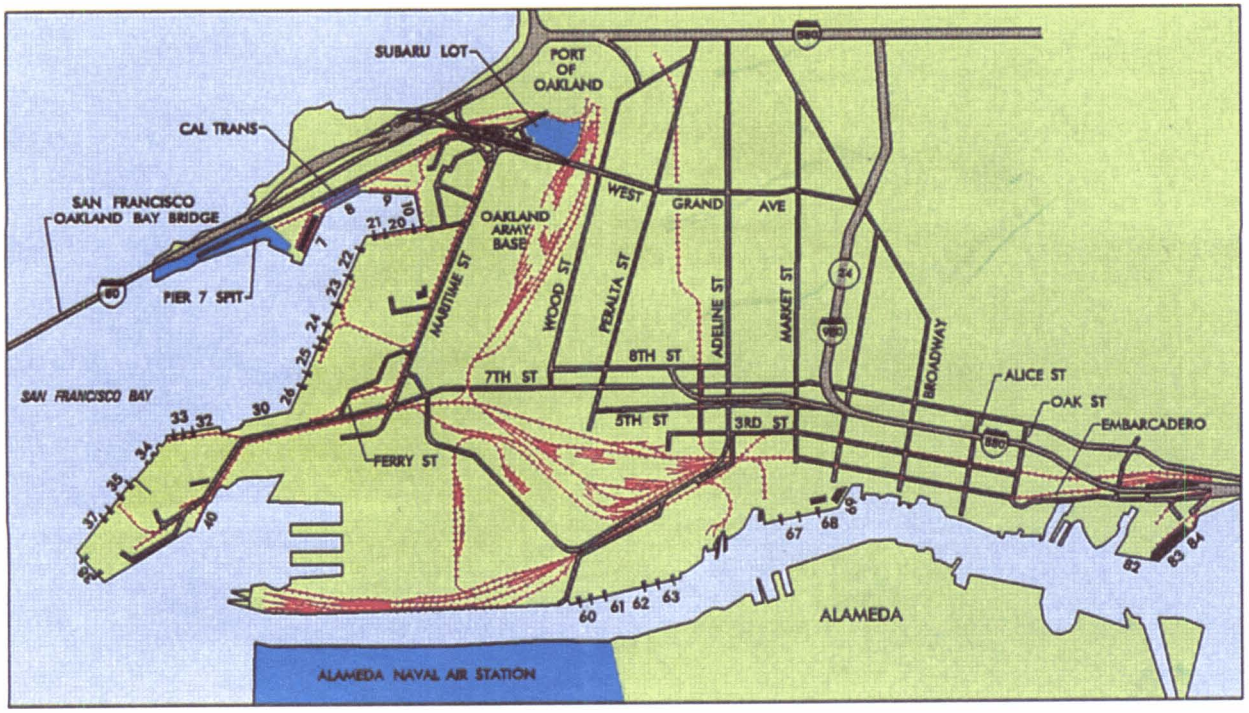
Figure 8. 1302d Major Port Command fixed rail end ramp near berth 7.

Figure 9. 1302d Major Port Command portable rail end ramp.

Marshaling Areas

Potential marshaling areas include the Oakland Coliseum parking lots (about 112 acres), Alameda Naval Air Station (about 174 acres), the Subaru lot (about 21 acres), and the Cal Trans Yard on Oakland Army Base (about 14 acres). In addition, the spit on the west end of pier 7, at MPC, has about 10 acres of unimproved storage area.

Marshaling Areas Near Oakland



Marshaling Areas Near the Port of Oakland

MATERIALS HANDLING EQUIPMENT (MHE)

The Port of Oakland and MPC provide an extensive list of MHE available for port operations. This list includes 28 container cranes. The Port of Oakland lists 10 local stevedoring companies that can provide additional MHE support if needed.

PORT OF OAKLAND
MATERIALS HANDLING EQUIPMENT

EQUIPMENT TYPE	CAPACITY (LTON)	QUANTITY	OWNER
Container Crane	50.0	7	Port and Maersk
Container Crane	45.0	2	Port
Container Crane	40.0	12	Port, Matson, and APL
Container Crane	30.0	6	Port and Matson
Container Crane	30.5	1	Matson
Gantry Crane	35.7	9	Port
Straddle Carrier	35.7	3	Port

Container Cranes at Sea-Land Terminal (southwest view)

MPC
MATERIALS HANDLING EQUIPMENT

EQUIPMENT TYPE	CAPACITY (LTON)	QUANTITY	OWNER
Gantry Crane	100.0	1	USA
Truck Crane	60.0	1	USA
Forklift 30.0K	30.0	2	USA
Forklift 15.0K	15.0	2	USA
Forklift 6.0K	6.0	11	USA
Forklift 4.0K	4.0	5	USA
Forklift 26.0K	26.0	1	Contractor
Forklift 15.5K	15.5	4	Contractor
Forklift 15.0K	15.0	2	Contractor
Forklift 7.5K	7.5	3	Contractor
Forklift 4.0K	4.0	4	Contractor
Forklift 3.0K	3.0	6	Contractor

1032d Major Port Command 60-Ton Truck Crane

INTERMODAL FACILITIES

General

The SP and UP railroad companies operate truck/railcar intermodal facilities in Oakland near the port area (fig 1). ATSF has an intermodal facility in Richmond, California, 11 miles north of the ports.

SP

The SP intermodal facility is off Middle Harbor Road. It is situated on 5 acres and has the capability to stage about 1,000 40-foot truck chassis. Transfer operations are conducted on 4 tracks that provide 115 89-foot flatcar spots. Container loading operations are conducted with two straddle cranes and one side loader (piggy packer). SP handles trailers on flatcars and double-stacked containers on flatcars. The normal hours of operation are from 0500 to 0200 hours. One portable end ramp is available, although it is rarely used. The current activity level is about 600 lifts per day.

Southern Pacific Intermodal Yard Straddle Crane (Transtainer)

UP

The UP intermodal facility is west of the APL Terminal and south of the Naval Supply Center, at 1750 Ferro Street. This facility is on 95 acres and has the capability to stage about 400 40-foot truck chassis. Transfer operations are conducted on 3 tracks that provide 158 89-foot flatcar lengths. Container loading operations are conducted by using two overhead straddle cranes and two side loaders. Beginning in 1994, UP will not use straddle cranes, but will have four side loaders. UP handles trailers on flatcars and double-stacked containers on flatcars. The UP facility working hours are 0500 to 2400 hours on weekdays, 0800 to 2400 hours on Saturdays, and 1200 to 2400 hours on Sundays. The current activity level is about 680 lifts per day.

Union Pacific Intermodal Yard Side Loader (Piggypacker)

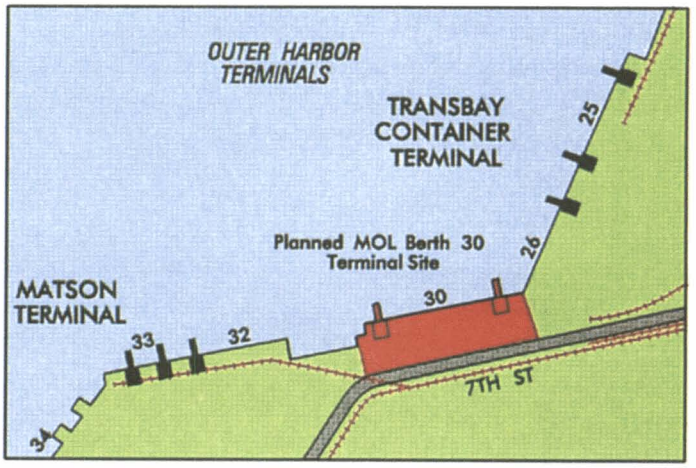
ATSF

ATSF has an intermodal facility at 303 Garrard Street, Richmond, California, about 11 miles north of the ports. This facility is situated on about 70 acres and has the capability to stage about 1,500 40-foot truck chassis. Transfer operations are conducted on 4 tracks that provide 150 89-foot flatcar lengths. Container loading operations are conducted by using two overhead straddle cranes and two side loaders. ATSF handles trailers on flatcars and double-stacked containers on flatcars. The ATSF facility is open 7 days a week, 24 hours a day. The current activity level is about 500 lifts per day.

FUTURE DEVELOPMENT

The Port of Oakland plans to complete construction of a new terminal. This terminal, berth 30, is between the Matson and Transbay Container Terminals.

The Bay Bridge Terminal will be reconstructed to repair damage caused by the 1989 earthquake. Channels to the port areas will be deepened to 42 feet MLW during the 1994-95 timeframe.



Future Berth 30 at Port of Oakland

MPC lists several projects that will affect port operations. The first project is the construction of a crossover railroad track over Burma Road, between the Baldwin railyard and the Barnes tracks. The purpose of this crossover is to eliminate the numerous switching and reverse movement operations that are now required because the ATSF Railway and Oakland Terminal Railway own the only tracks exiting the yard's west end. The planned completion date for this project is June 1997.

The second project is to build a deployment staging area that will support heavy tactical wheeled and tracked equipment associated with a typical mechanized infantry division. In addition to enhanced area lighting, new security fencing, and the extension of water distribution and storm sewer systems, the storage area surfacing will consist of rigid and flexible material. The port plans to complete this project by April 1997.

Bay Bridge Terminal

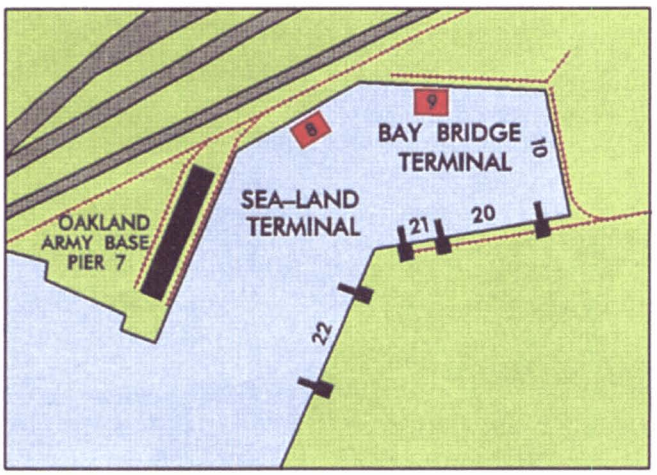
MPC plans to repair 18 miles of the port's railroad tracks to comply with the requirements of the *Railroad Track Standards* (TM 5-628) and Federal Railroad Administration Class 2 Track Standards. The estimated completion of the project is September 1995.

The California Department of Transportation is performing road construction to improve I-880 and connecting roadway systems near the port. Construction will require a realignment of Army-owned roads and railroad tracks and the re-siting of a Sixth US Army Reserve 400-Member Center and Readiness Group Facility planned for Oakland Army Base. Also, the SP and ATSF local railyards must be reconfigured/relocated because of this construction. The planned completion date of this project is March 1998.

The Port of Oakland and MPC are discussing long-term lease possibilities of berths 8 and 9. These berths are currently under lease to the Port of Oakland through September 1996.

ATSF plans to replace a railroad overpass structure that joins Oakland Army Base. Part of the replacement bridge will be on Army property. Discussions are ongoing for the Army to grant ATSF an easement.

The East Bay Municipal Utility District is attempting to acquire a portion of a 20-acre open storage area on Oakland Army Base for expansion of a sewage treatment facility. Oakland Army Base opposes this acquisition effort, which is now going through Congressional channels.

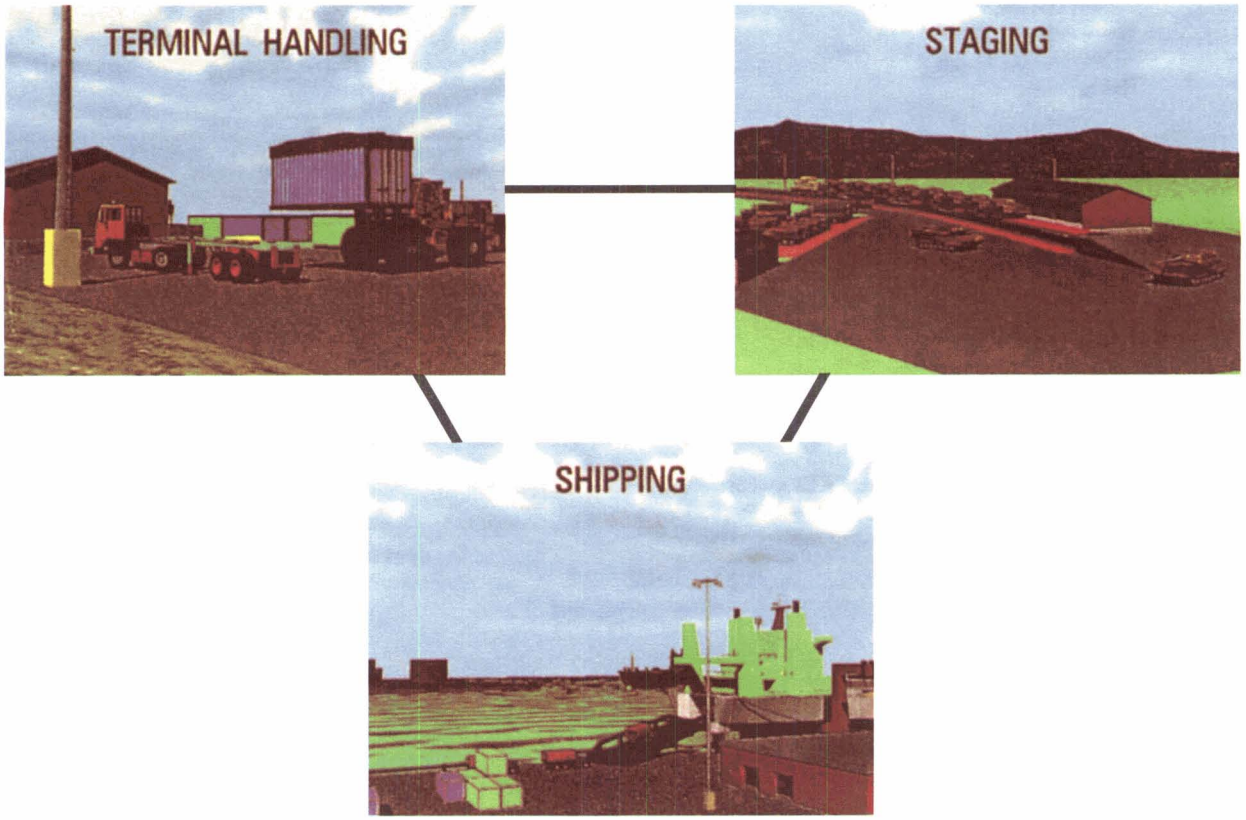


Berths 8 and 9 at Bay Bridge Terminal

II. THROUGHPUT ANALYSIS

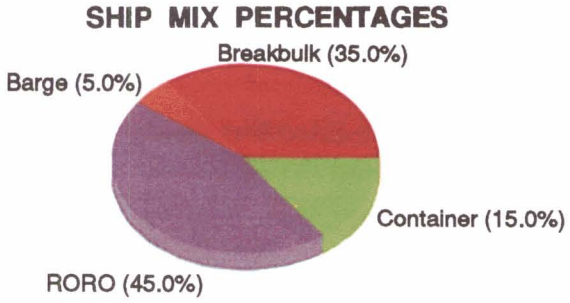
GENERAL

This section evaluates the theoretical throughput capability of the Port of Oakland and MPC, based on the port operational performance simulator (POPS) computer model. The model is based on a weak-link analysis in which each subsystem is analyzed separately and then compared to find the least-capable subsystem. The weakest subsystem defines the maximum throughput capability of the terminal. The model yields throughput capability values for three subsystems - shipping, staging, and terminal processing and/or handling - in short tons (STON) and measurement tons (MTON) per day.



Terminal Throughput Subsystems

The analysis assumes that 80 percent of the port facilities (100 percent for MPC) will support the military deployment. Also, the ship mix is based on Desert Shield and Desert Storm statistics. We weighted the percentages to adjust for differences in cargo deadweights and expectations for future deployments.



TERMINAL RECEPTION/HANDLING

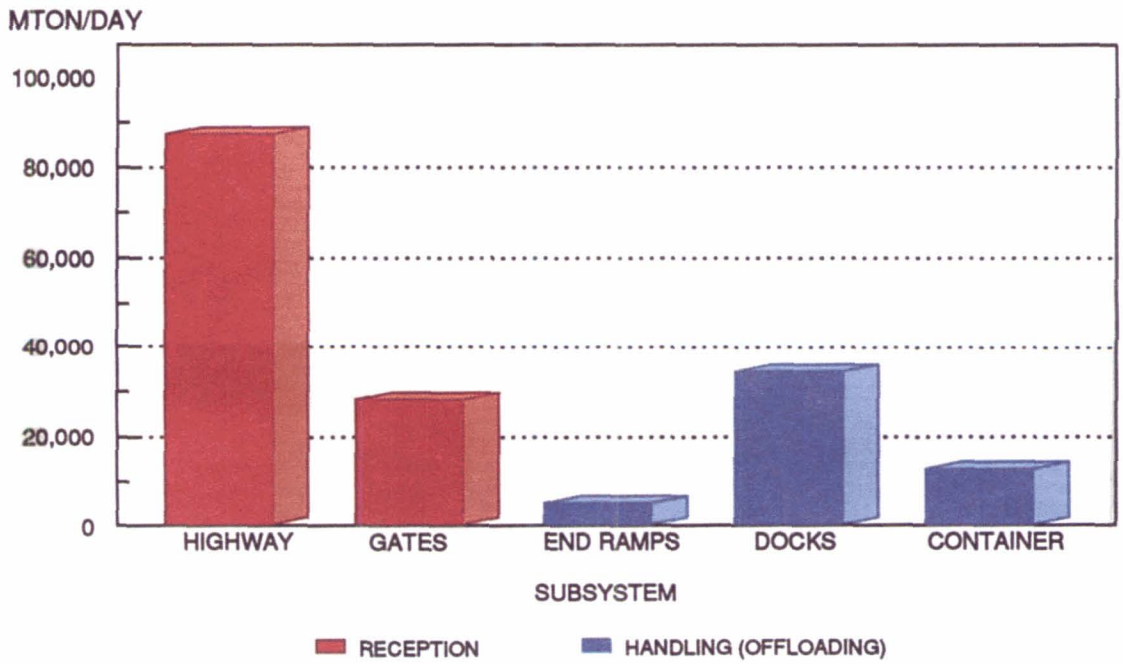
Highway

I-80 and I-880 and the major connectors (Middle Harbor, Burma, Maritime, and Seventh) provide good access to the ports.

Entrance to MPC and berths 8 through 10 of the Port of Oakland is provided through Bay Bridge Gate on Burma Road. This roadway provides access to staging and wharf areas. The road network in and out of the port, including the gate processing of vehicles, could handle almost 30,500 MTON of equipment and supplies per day.

For deployment from pier 7 of MPC, roadable vehicles in convoys will process directly to staging areas. MPC does not have truck end ramps for offloading vehicles on commercial or military flatbed trailers. Assuming MPC can arrange for an end ramp, about 4,800 MTON could be offloaded per day by the end-ramp method. Supplies in van semitrailers will proceed to the transit shed docks for offloading. These facilities provide 65 handling positions and could offload about 33,800 MTON of cargo per day. Containers on trucks can proceed to staging areas to be offloaded or go directly to the pier. The facilities at pier 7 could offload about 12,500 MTON of containerized cargo per day.

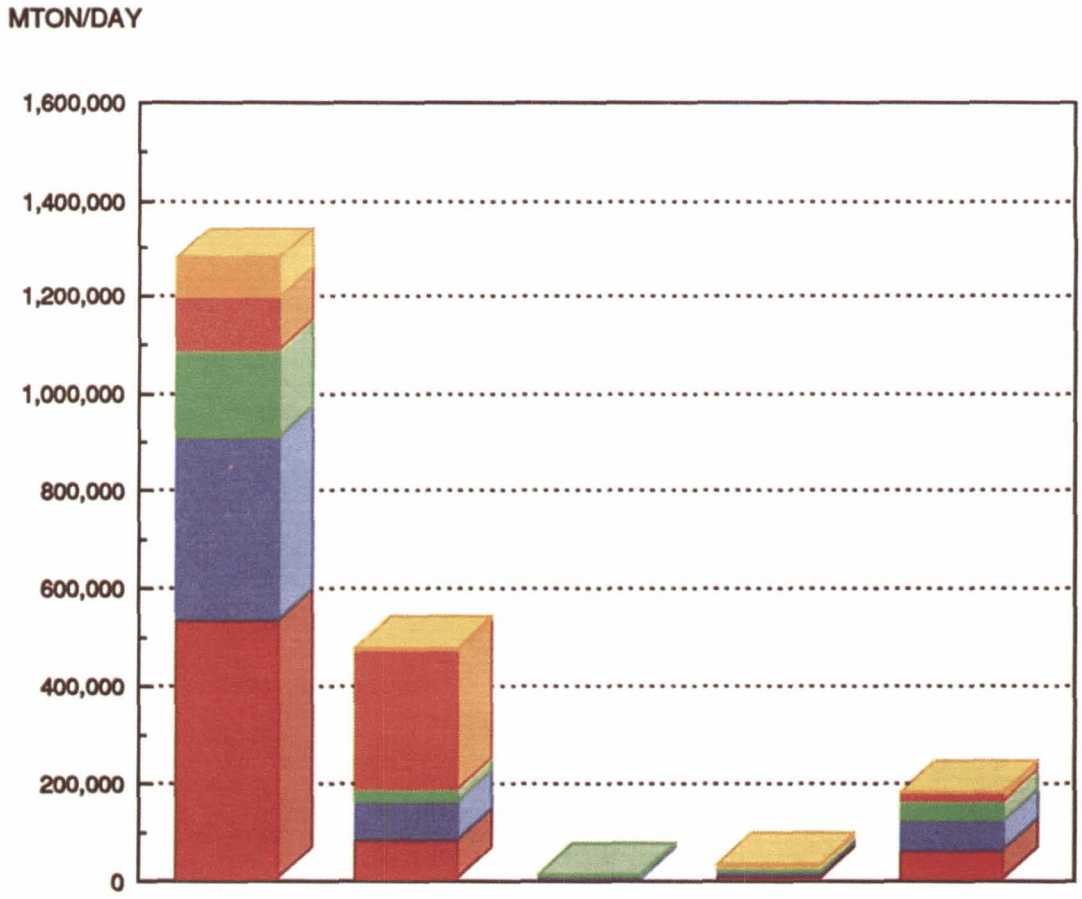
1302D MPC HIGHWAY RECEPTION/HANDLING CAPABILITY



Entrance to the rest of the Port of Oakland is provided through 11 other gates. They are Sea-Land, Yusen, Maersk, Transbay, Matson, TraPac, Seventh Street, Berth 40, APL, Howard, and Ninth Avenue. The roadways from these gates provide access to staging and wharf areas. The road networks in and out of the port, including the gate processing of vehicles, could handle almost 471,800 MTON of equipment and supplies per day.

For deployment from the Port of Oakland, roadable vehicles in convoys process directly to staging areas. The Port of Oakland has two portable truck end ramps for offloading vehicles on commercial or military flatbed trailers. In this port study, we allocated the two truck end ramps to the APL and Seventh Street Terminals, to prevent interference with rail and container handling operations. These ramps could offload 9,600 MTON per day. Supplies in van semitrailers will proceed to the transit sheds/container freight station docks for offloading. These facilities provide 218 handling positions and could offload about 29,000 MTON of cargo per day. Containers on trucks will proceed to staging areas to be offloaded or will go directly to the container loading piers. The container handling facilities could offload more than 177,600 MTON of cargo per day.

OAKLAND HIGHWAY RECEPTION/HANDLING CAPABILITY



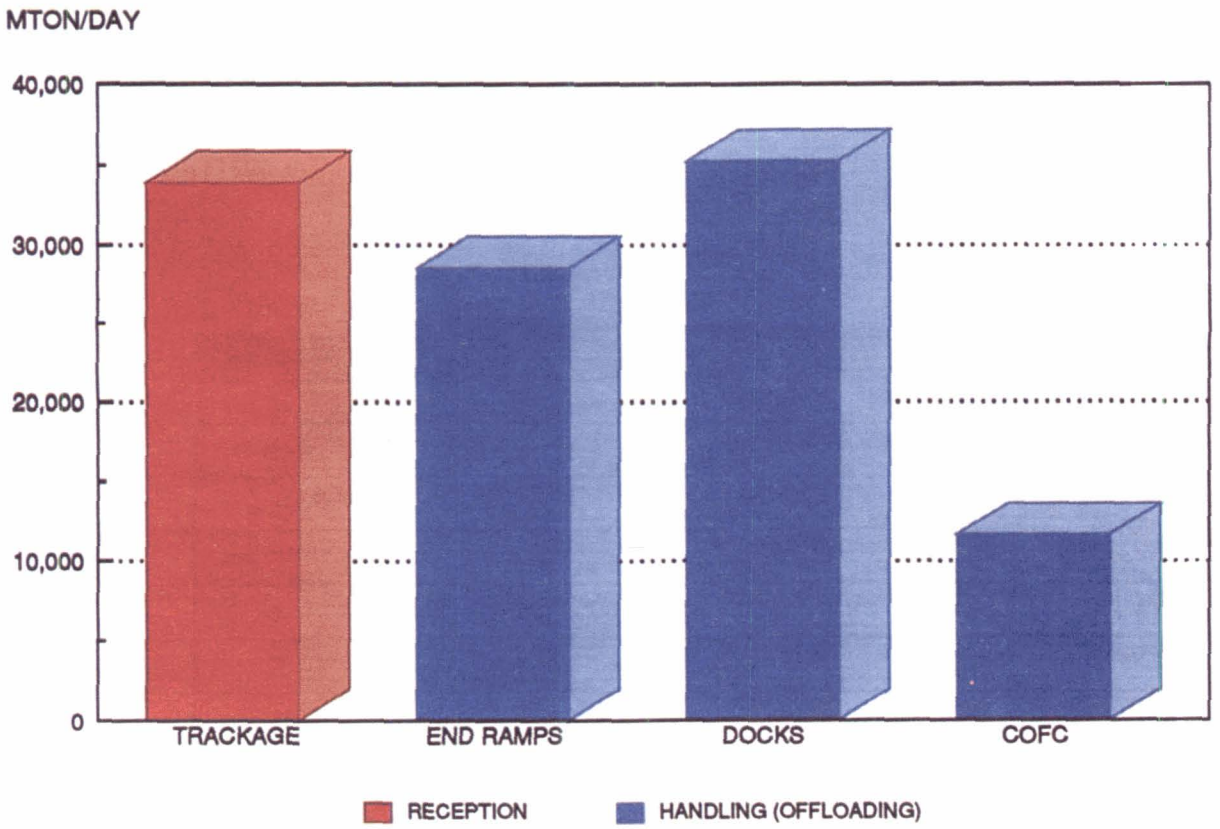
	HIGHWAY	GATES	END RAMPS	DOCKS	CONTAINER
OUTER HARBOR	530,000	81,600	0	7,400	59,900
7TH STREET	373,500	76,800	4,800	6,000	59,600
APL	178,100	24,400	4,800	10,000	39,000
HOWARD	108,900	282,700	0	1,100	17,400
NINTH	79,600	6,300	0	4,500	1,700

Rail

Rail reception at the ports is very good, with three commercial carriers providing access to the ports. Railyards at MPC can store more than 500 railcars. Also, commercial railyards within 11 miles of the port could store more than 2,500 additional cars. The Port of Oakland does not have any railcar storage tracks. The current rail service to the ports ranges from 18 to 20 trains consisting of 80 to 100 railcars per day.

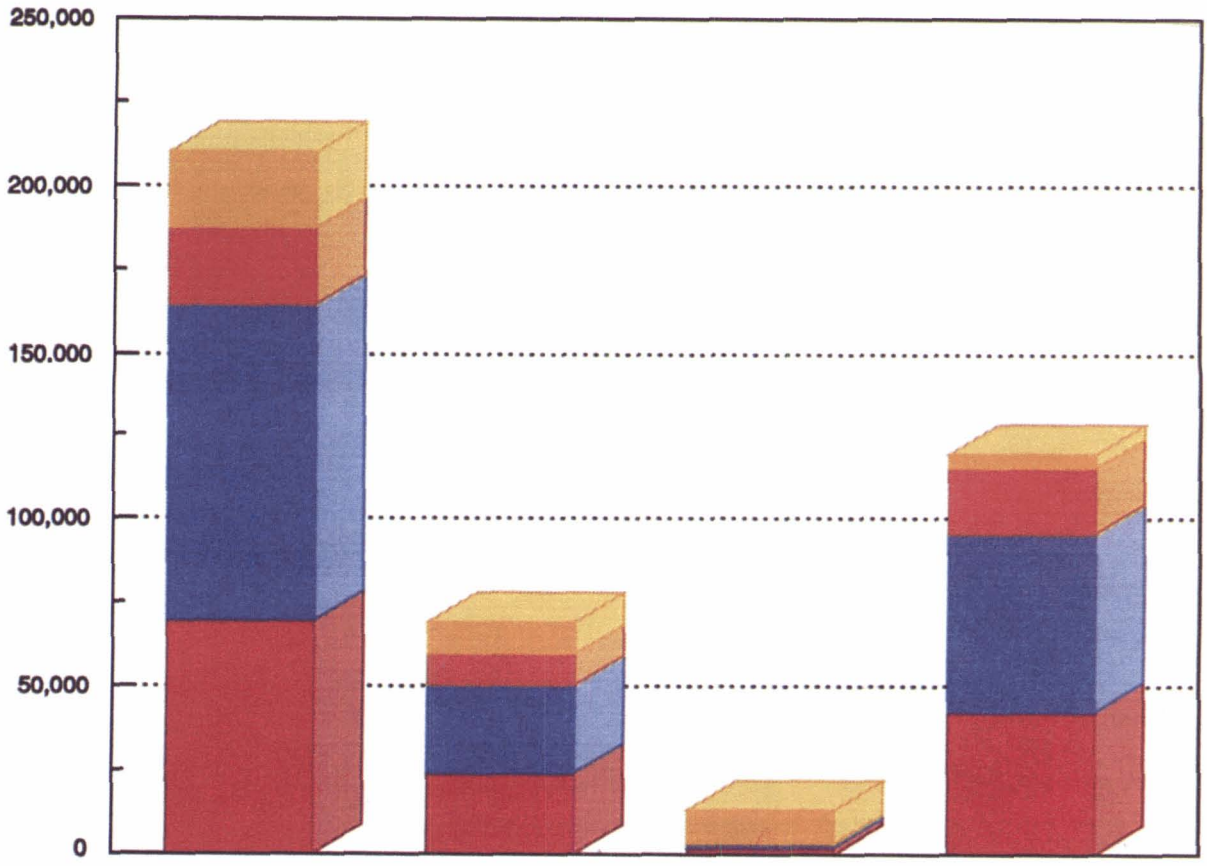
Vehicles on flatcars could be offloaded at every terminal that is capable of handling rail traffic. The Port of Oakland does not have any rail end ramps; however, both fixed and portable end ramps are available at the nearby railyards. The UP, SP, and ATSF railroad companies have a combined total of six end ramps available for offloading vehicles on flatcars. MPC has four (two fixed and two portable) end ramps for rail offloadings. Boxcars could be offloaded at the transit sheds/container freight stations at the Port of Oakland. The port has 33 rail handling positions available for offloading boxcars. MPC has 48 rail handling positions available at transit sheds on post. Containers would be offloaded at the container handling facilities of both MPC and the Port of Oakland.

RAIL RECEPTION/HANDLING CAPABILITY
1302D MPC



OAKLAND RAIL RECEPTION/HANDLING CAPABILITY

MTON/DAY



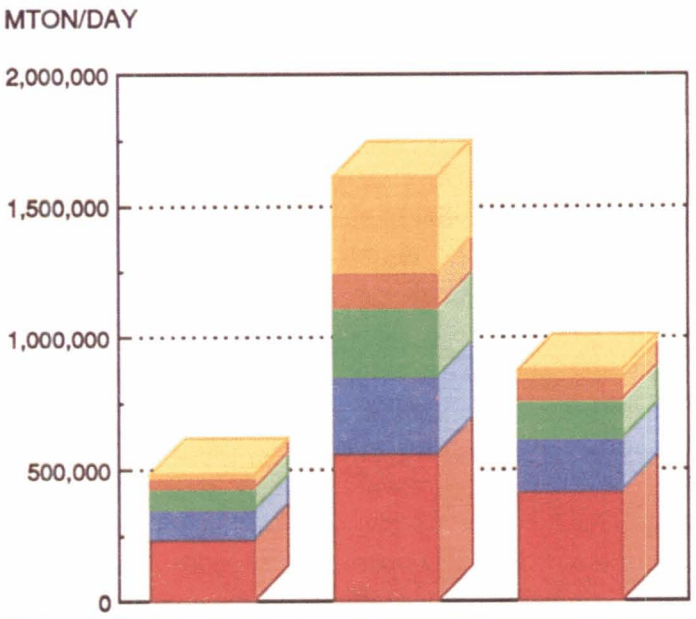
SUBSYSTEMS	TRACKAGE RECEPTION	END RAMPS HANDLING	DOCKS HANDLING	COFC HANDLING
OUTER HARBOR	69,800	24,200	2,000	42,600
7TH STREET	94,800	26,200	1,100	53,300
APL	0	0	0	0
HOWARD	22,900	9,300	0	19,500
NINTH	22,400	9,300	10,200	4,100

STAGING

The Port of Oakland has about 360 acres of open storage for vehicles and/or containers. This staging area has a capability to store about 483,800 MTON of rolling stock and 1,612,600 MTON of containers. Also, about 475,200 square feet of covered storage provides protection for about 7,600 MTON of palletized cargo.

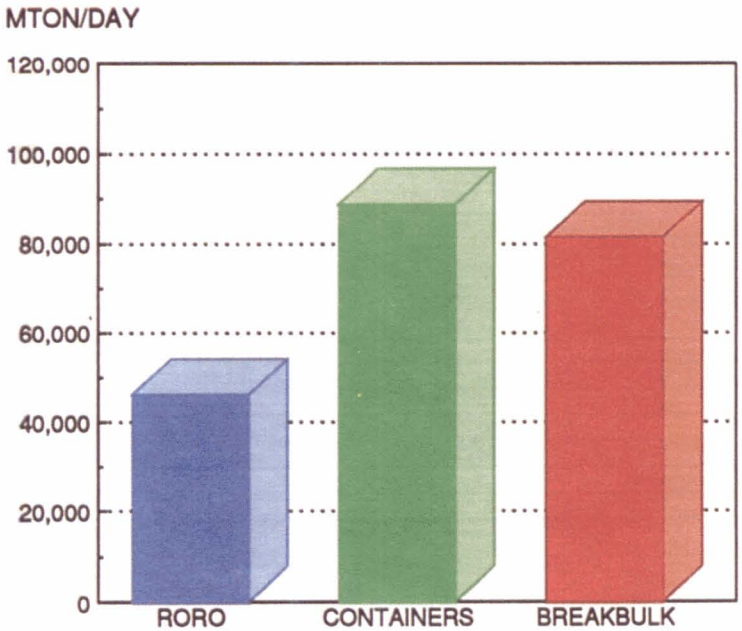
MPC has about 32 acres of open storage for breakbulk cargo and/or containers. This staging area has a capability to store about 46,200 MTON of rolling stock and 88,700 MTON of containers. Also, about 777,450 square feet of covered storage provides protection for about 38,900 MTON of palletized cargo.

STAGING CAPABILITY - PORT OF OAKLAND



	VEHICLES	CONTAINERS	BREAKBULK
OUTER HARBOR	238,500	562,700	420,500
7TH STREET	110,700	290,000	195,200
APL	82,400	260,400	145,400
HOWARD	41,500	130,900	83,100
NINTH	10,700	368,600	30,700

STAGING CAPABILITY - 1302D MPC



SHIPPING

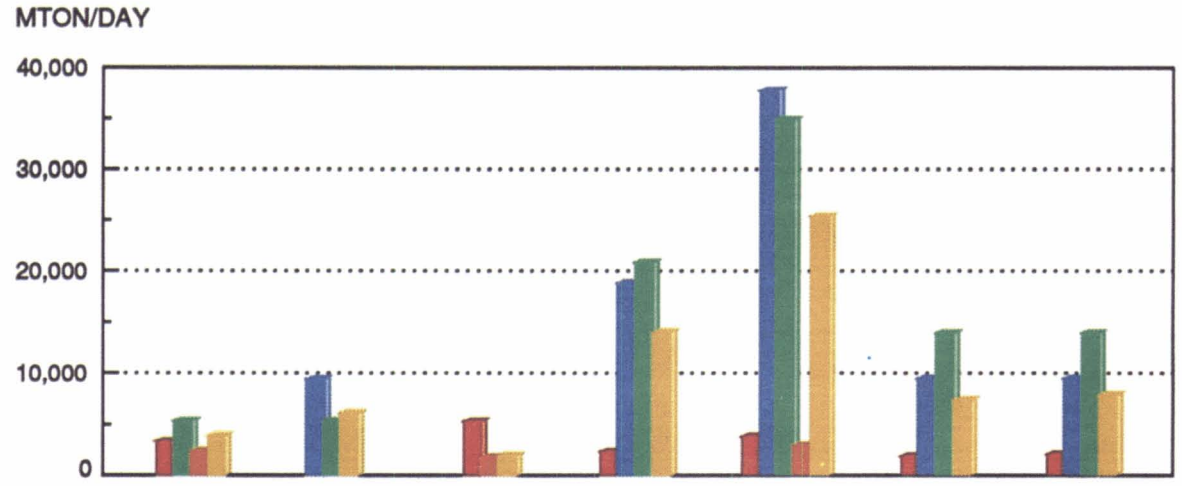
The following charts show the throughput capability per berth in MTON per day for breakbulk, RORO, container, and mixed vessels. These results are based on various factors, including MHE used and loading, operational, and berth utilization rates, as well as berth/ship compatibility.

The berth/ship compatibility for various vessel types is shown in table 1. This table indicates, for each type of ship, the number of vessels that can be accommodated at each berth. The table also provides the limitations that can hinder shipping operations.

The type of ship preferred at each berth is based on a methodology that compares the characteristics of the ship berth to a list of ideal factors required to support the different ship mixes. The evaluation takes into consideration the current physical characteristics and MHE available for a berth. This evaluation gives no considerations for enhancements, such as equipment.

Berths 32-33, 24, and 67-68, in that order, appear to be the best choices for container operations. The best choices for RORO operations appear to be berths 24, 32-33, and 23. Berth 7 of MPC appears to be the best choice for breakbulk and barge operations. Berths 67-68, 24, and 23 appear to be the best choices for all-around operations.

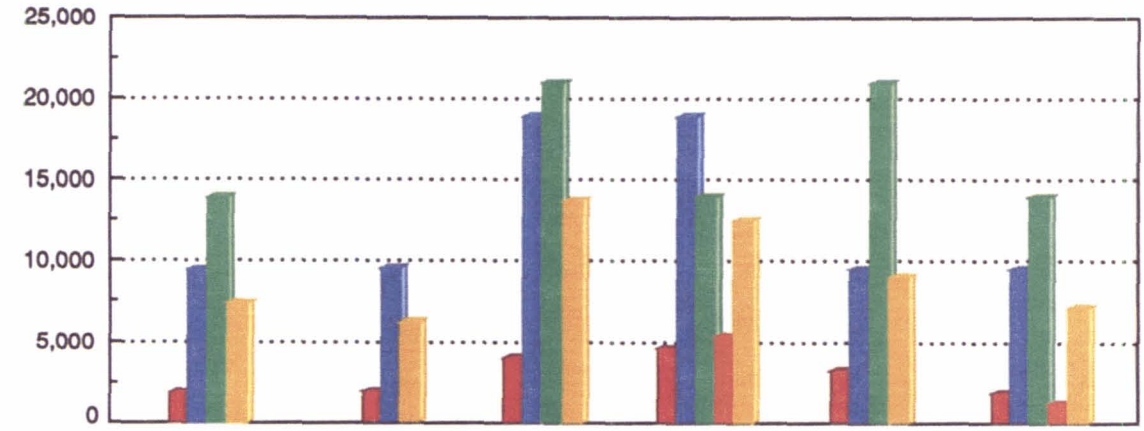
BERTH THROUGHPUT CAPABILITY



BERTH	83-84	82	69	67-68	60-63	38	37
BREAKBULK	3,400	0	5,300	2,400	3,800	1,900	2,000
RORO	0	9,400	0	18,900	37,700	9,400	9,400
CONTAINER	5,300	5,300	0	20,900	34,800	13,900	13,900
BARGE	2,400	0	1,800	0	2,900	0	0
MIXED	3,800	6,100	1,900	14,000	25,300	7,400	7,800

BERTH THROUGHPUT CAPABILITY

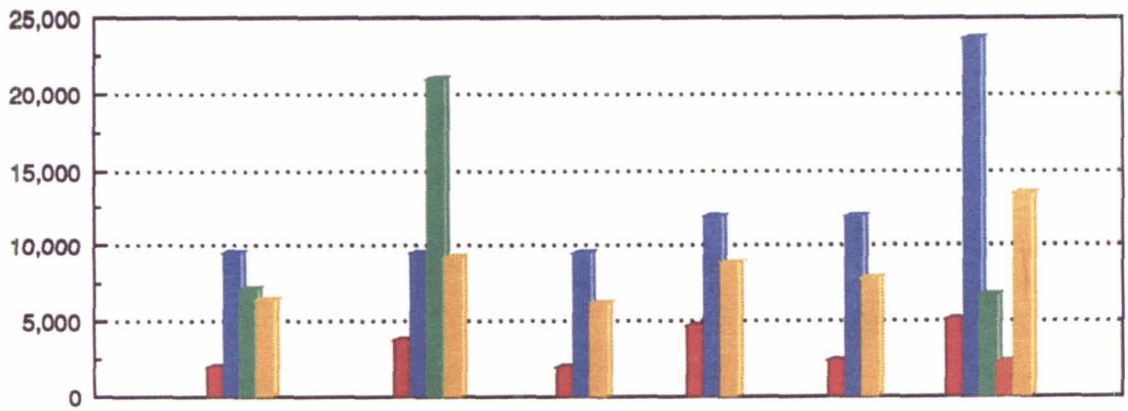
MTON/DAY



BERTH	35	34	32-33	25-26	24	23
BREAKBULK	1,900	1,900	4,000	4,600	3,200	1,900
RORO	9,400	9,400	18,900	18,900	9,400	9,400
CONTAINER	13,900	0	20,900	13,900	20,900	13,900
BARGE	0	0	0	5,300	0	1,200
MIXED	7,400	6,100	13,700	12,500	8,900	7,000

BERTH THROUGHPUT CAPABILITY

MTON/DAY



BERTH	22	20-21	10	9	8	PIER 7
BREAKBULK	1,900	3,700	1,900	4,600	2,300	5,000
RORO	9,400	9,400	9,400	11,800	11,800	23,600
CONTAINER	7,000	20,900	0	0	0	6,600
BARGE	0	0	0	0	0	2,200
MIXED	6,300	9,100	6,100	8,700	7,700	13,500

NOTE: The 1302d MPC owns berths 8 and 9, which are currently leased to the Port of Oakland. The current agreement allows the 1302d MPC to operate these berths within 7 days of notification. Hence, the 1302d would gain the throughput of these berths after 7 days.

TABLE 1
PORT OF OAKLAND
SUMMARY OF SEALAND, YUSEN, MAERSK, TCT, AND MATSON BERTHING CAPABILITIES

	BERTHS						
	SEALAND		*YUSEN*	*MAERSK*	*TCT*	*MATSON*	
VESSEL	22	20 - 21	23	24	25 - 26	32 - 33	34
Breakbulk							
C3-S-33a	1	2	1	2	2	3	1
C3-S-37c	1	2	1	2	2	2	1
C3-S-37d	1	2	1	2	2	2	1
C3-S-38a	1	2	1	2	2	2	1
C4-S-1a	1	1	1	1	2	2	1
C4-S-1qb and 1u	1	1	1	1	2	2	1
C4-S-58a	1	1	1	1	2	2	1
C4-S-65a	1	2	1	1	2	2	1
C4-S-66a	1	2	1	1	2	2	1
C4-S-69b	1	1	1	1	2	2	1
Seatrain							
GA and PR-class	1	2	1	1	2	2	1
Barge							
LASH C8-S-81b	1	1	1	1	1	1	c
LASH C9-S-81d	c	1	1	1	a	a	a,c
LASH lighter	6	8	6	7	9	10	5
SEABEE C8-S-82a	g	g	g	g	a,g	a,g	a,c,g
SEABEE barge	4	5	4	5	6	7	3
RORO							
Comet	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j
C7-S-95a/Maine-class	1	1	1	1	1	2	c
Ponce-class	h	h	h	h	h	(1)	(1)
Great Land-class	h	h	h	h	h	(1)	c
Cygnus/Pilot-class	1	1	1	1	2	2	1
Meteor	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j
AmEagle/Condor	i,j	i,j	i,j	i,j	i,j	i,j	i,j
MV Ambassador	d	d	d	d	d	d	d
FSS-class	c	1	c	1	1	1	c
Cape D-class	i,j	i,j	i,j	i,j	i,j	i,j	i,j
Cape H-class	1	1	1	1	a	a	a,c
Container							
C6-S-1w	1	1	1	1	1	2	1,e
C7-S-68e	1	1	1	1	1	2	1,e
C8-S-85c	1	1	1	1	1	1	c,e
Combination							
C5-S-78a	1	1	1	1	2	2	1,e
C5-S-37e	1	1	1	1	2	2	1,e

a = maximum vessel draft limited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
e = no container-handling equipment
f = inadequate berth depth, adequate anchorage depth
g = inadequate channel depth
h = no shore-based ramps available
i = insufficient ramp clearance at low tide
j = insufficient ramp clearance at high tide
k = excessive ramp angle at low tide
m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

( ) indicates vessels assigned by analyst.
Note: Ramp clearance and ramp angle based on maximum vessel draft.

TABLE 1 - cont

PORT OF OAKLAND - SUMMARY OF TRAPAC, SEVENTH MCT, APL, AND HOWARD BERTHING CAPABILITIES

	BERTHS					
	TRAPAC	*SEVENTH MCT*		*APL*	*HOWARD*	
VESSEL	35	37	38	60 - 63	67 - 68	69
Breakbulk						
C3-S-33a	1	2	1	5	3	1
C3-S-37c	1	2	1	5	3	1
C3-S-37d	1	2	1	5	3	1
C3-S-38a	1	2	1	5	3	1
C4-S-1a	1	1	1	4	2	1
C4-S-1qb and 1u	1	1	1	4	2	1
C4-S-58a	1	1	1	4	2	c
C4-S-65a	1	1	1	4	2	1
C4-S-66a	1	1	1	4	2	1
C4-S-69b	1	1	1	4	2	c
Seatrain						
GA and PR-class	1	1	1	4	2	1
Barge						
LASH C8-S-81b	1	1	1	3	2	c
LASH C9-S-81d	1	1	c	2	1	a,c
LASH lighter	6	7	6	19	12	4
SEABEE C8-S-82a	g	g	c,g	a,g	g	a,c,g
SEABEE barge	4	5	4	13	8	2
RORO						
Comet	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,o
C7-S-95a/Maine-class	1	1	1	3	2	b,c
Ponce-class	h	h	h	h	h	b,c,h
Great Land-class	h	h	h	h	h	b,c,h
Cygnus/Pilot-class	1	1	1	4	2	b,c
Meteor	d,i,j	d,i,j	d,i,j	d,i,j	d,i,j	d,o
AmEagle/Condor	i,j	i,j	i,j	i,j	i,j	b,c
MV Ambassador	d	d	d	d	d	d
FSS-class	c	1	c	2	1	b,c
Cape D-class	i,j	i,j	i,j	i,j	i,j	b,c
Cape H-class	i,i	1	1	3	2	a,b,c
Container						
C6-S-1w	1	1	1	3	2	c,e
C7-S-68e	1	1	1	3	2	c,e
C8-S-85c	1	1	1	3	2	c,e
Combination						
C5-S-78a	1	1	1	4	2	c,e
C5-S-37e	1	1	1	4	2	c,e

a = maximum vessel draft limited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
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k = excessive ramp angle at low tide
m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.

TABLE 1 - cont
PORT OF OAKLAND - SUMMARY OF BAY BRIDGE TERMINAL AND NINTH AVENUE BERTHING CAPABILITIES

VESSEL	BERTHS				
	BAY BRIDGE TERMINAL			NINTH AVENUE	
	8	9	10	83 - 84	82
Breakbulk					
C3-S-33a	1	2	1	2	1
C3-S-37c	1	2	1	2	1
C3-S-37d	1	2	1	2	1
C3-S-38a	1	2	1	2	1
C4-S-1a	1	2	1	1	1
C4-S-1qb and 1u	1	2	1	1	1
C4-S-58a	1	2	1	1	1
C4-S-65a	1	2	1	1	1
C4-S-66a	1	2	1	1	1
C4-S-69b	1	1	1	1	1
Seatrain					
GA and PR-class	1	2	1	1	1
Barge					
LASH C8-S-81b	1	1	1	1	1
LASH C9-S-81d	a	a	a,c	a,g	a,g
LASH lighter	7	8	5	7	6
SEABEE C8-S-82a	a,g	a,g	a,c,g	a,g	a,g
SEABEE barge	5	6	4	5	4
RORO					
Comet	(1)	(2)	i,j	d,o	d,i,j
C7-S-95a/Maine-class	1	1	1	b	1
Ponce-class	h	h	h	b,h	h
Great Land-class	h	h	h	b,h	h
Cygnus/Pilot-class	1	1	1	b	1
Meteor	(1)	(2)	i,j	d,o	d,i,j
AmEagle/Condor	(1)	(1)	i,j	b	i,j
MV Ambassador	(1)	(2)	1,m	d	d
FSS-class	1n	1	c	b	1
Cape D-class	(1)	(1)	i,j	b	i,j
Cape H-class	(1)	(1)	a	a,b,g	a,g
Container					
C6-S-1w	1,e	1,e	1,e	1,e	1,e
C7-S-68e	1,e	1,e	1,e	1,e	1,e
C8-S-85c	1,e	1,e	1,e	1,e	1,e
Combination					
C5-S-78a	1,e	1,e	1,e	1,e	1,e
C5-S-37e	1,e	1,e	1,e	1,e	1,e

a = maximum vessel draft limited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
e = no container-handling equipment
f = inadequate berth depth, adequate anchorage depth
g = inadequate channel depth
h = no shore-based ramps available
i = insufficient ramp clearance at low tide
j = insufficient ramp clearance at high tide
k = excessive ramp angle at low tide
m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.
( ) indicates vessels assigned by analyst.

TABLE 1 - cont
PORT OF 1302D MAJOR PORT COMMAND
SUMMARY OF BERTHING CAPABILITIES

VESSEL	BERTHS 7 PIER
Breakbulk	
C3-S-33a	2
C3-S-37c	2
C3-S-37d	2
C3-S-38a	2
C4-S-1a	2
C4-S-1qb and 1u	2
C4-S-58a	2
C4-S-65a	2
C4-S-66a	2
C4-S-69b	2
Seatrain	
GA and PR-class	2
Barge	
LASH C8-S-81b	1
LASH C9-S-81d	a
LASH lighter	10
SEABEE C8-S-82a	a,g
SEABEE barge	7
RORO	
Comet	(2),d,i
C7-S-95a/Maine-class	1
Ponce-class	h
Great Land-class	h
Cygnus/Pilot-class	2
Meteor	(2),d
AmEagle/Condor	(2)
MV Ambassador	(2)
FSS-class	1
Cape D-class	(2)
Cape H-class	(1)
Container	
C6-S-1w	2,e
C7-S-68e	2,e
C8-S-85c	1,e
Combination	
C5-S-78a	2,e
C5-S-37e	2,e

a = maximum vessel draft limited to berth depth
b = inadequate apron width
c = inadequate berth length
d = no straight stern-ramp facilities
e = no container-handling equipment
f = inadequate berth depth, adequate anchorage depth
g = inadequate channel depth
h = no shore-based ramps available
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m = excessive ramp angle at high tide
n = parallel ramp operation only
o = insufficient apron width for side-ramp operation

Note: Ramp clearance and ramp angle based on maximum vessel draft.
( ) indicates vessels assigned by analyst.

TABLE 1
PREFERENCE BERTH SELECTION

LOADING TYPE	*BERTHS*						
	7	**8**	**9**	**10**	**20-21**	**22**	**23**
Breakbulk	1	16	16	16	12	12	6
RORO	4	15	4	4	10	14	2
Container	5	18	17	16	13	14	6
Barge	1	18	17	13	13	13	5
	24	**25-26**	**32-33**	**34**	**35**	**37**	**38**
Breakbulk	6	14	15	19	8	8	8
RORO	1	11	2	17	11	7	13
Container	2	9	1	15	11	7	11
Barge	5	9	16	19	9	9	9
			60-63	**67-68**	**69**	**82**	**83-84**
Breakbulk			8	2	5	4	3
RORO			7	7	-	16	-
Container			4	3	-	7	10
Barge			7	2	8	4	3

Notes:

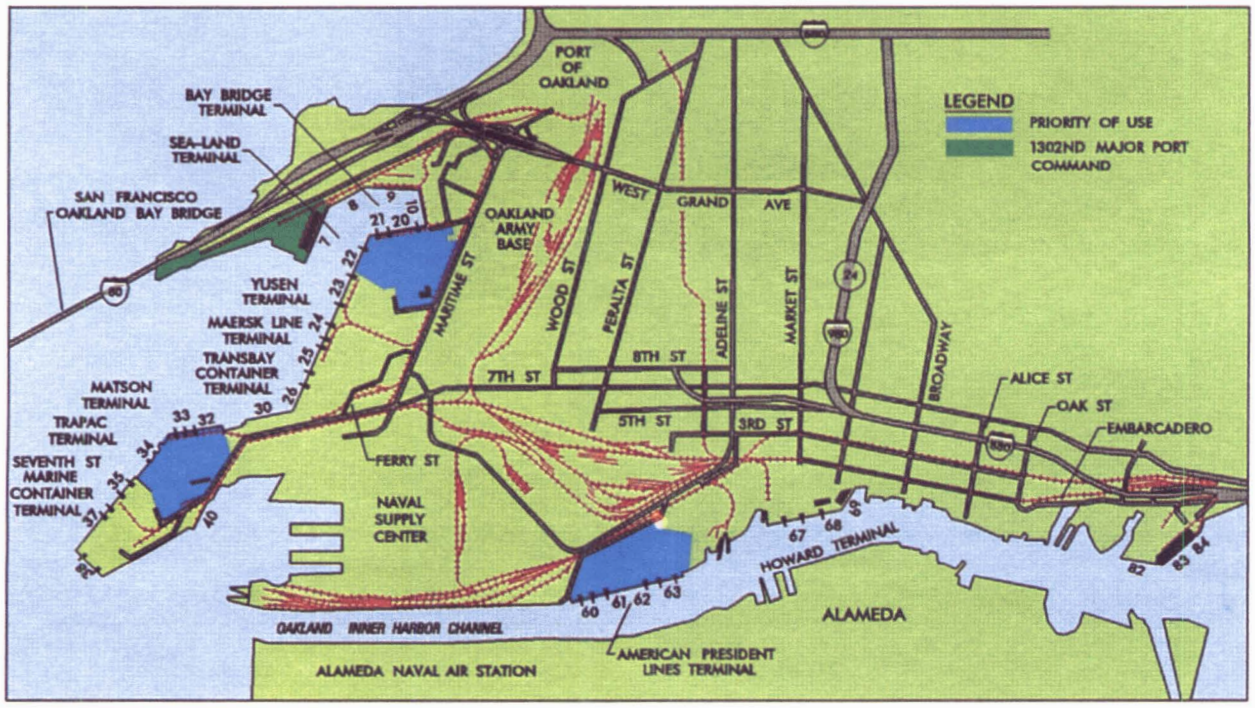
Berths marked with "-" are not recommended for these operations.

The numbers refer to the berth ranking in terms of berth preference. For example, berth 7 has a number 1 ranking for breakbulk and barge loadings. Hence, it is the preferred berth for these operations.

III. APPLICATION

GENERAL

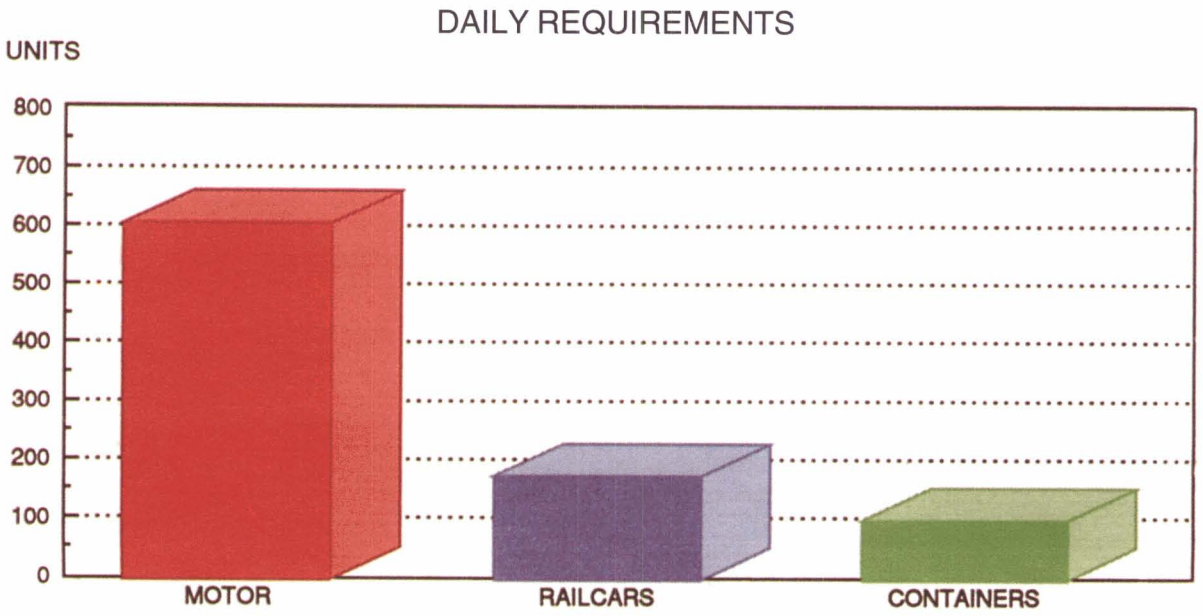
This section of the report will evaluate the port's throughput capability for deploying a notional mechanized infantry division using mainly FSS vessels. The analysis will use only those facilities designated in the 14 February 1994 *Planning Orders Digest,* issued by MARAD, plus MPC. The orders call for the Port of Oakland to grant priority use of certain facilities prior to and during national emergencies. These facilities are the APL, Matson, and Sea-Land Terminals.



REQUIREMENTS

The likely requirement for the Port of Oakland plus MPC is to deploy a notional mechanized infantry division in 6 days. The division has to move about 7,800 vehicles and 660 containers. The movement of this division to the port will require about 1,055 (176 per day) railcars, using a convoy/rail option. Under this option, about 3,650 (610 per day) roadable vehicles would be driven and about 2,320 (387 per day) would be towed.

Total Equipment	
Volume	**274,518 MTON**
Weight	**95,010 STON**
Area	**1,422,844 SQ FT**
Vehicles	**7,800**
Containers (20 ft)	**660**

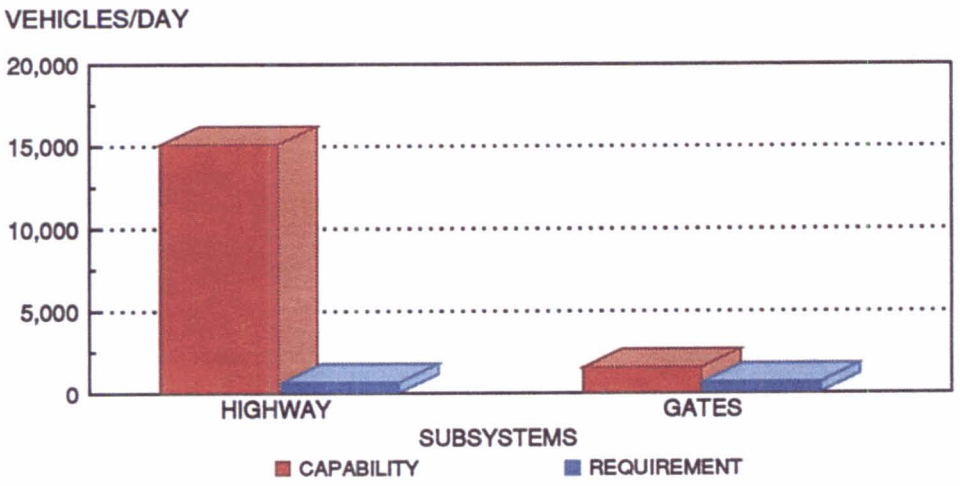


TERMINAL HANDLING

Highway

Vehicles would access MPC from Burma Road through Bay Bridge Gate for deployment from pier 7. Access to the Sea-Land Terminal is by way of Maritime Street through Sea-Land Gate. The Matson, TRAPAC, and Seventh Street Marine Container Terminals are accessible via Seventh Street through Matson and Seventh Street Gates. Vehicles can access the APL Terminal from Middle Harbor Road through APL Gate. Containers on chassis would use all of the above terminals, except pier 7. Both the access roads and gate processing subsystems could handle well over 1,500 vehicles per day.

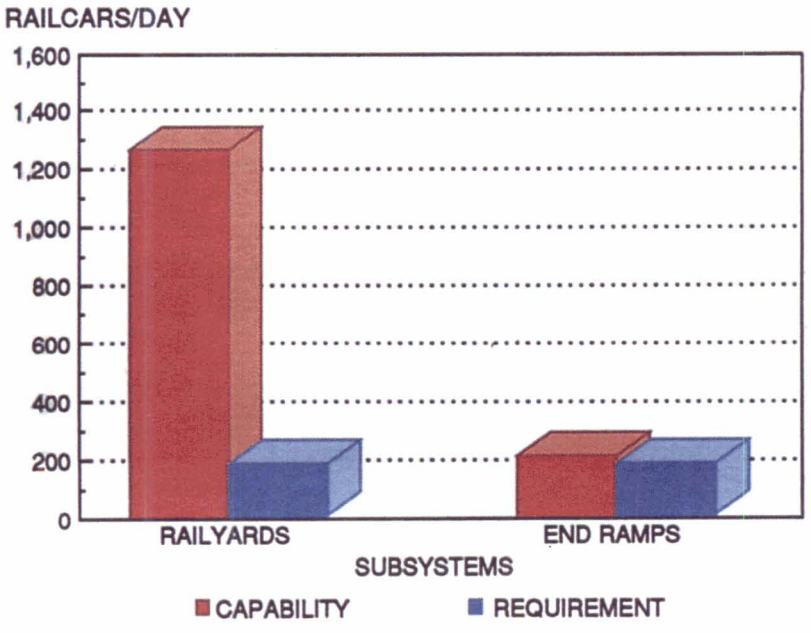
HIGHWAY INPROCESSING CAPABILITY



Rail

The classification yards within MPC and the nearby rail lines could handle more than 1,250 railcars per day (assumes 50 percent of total rail storage at railyards is available for military use). Also, assuming 4 of the 10 available end ramps are used for offloading, the end ramps could offload about 50 railcars every 5 hours, or more than 200 railcars per day. Since not all of the end ramps are used, the capability would be much higher than this 200-railcar-per-day estimate.

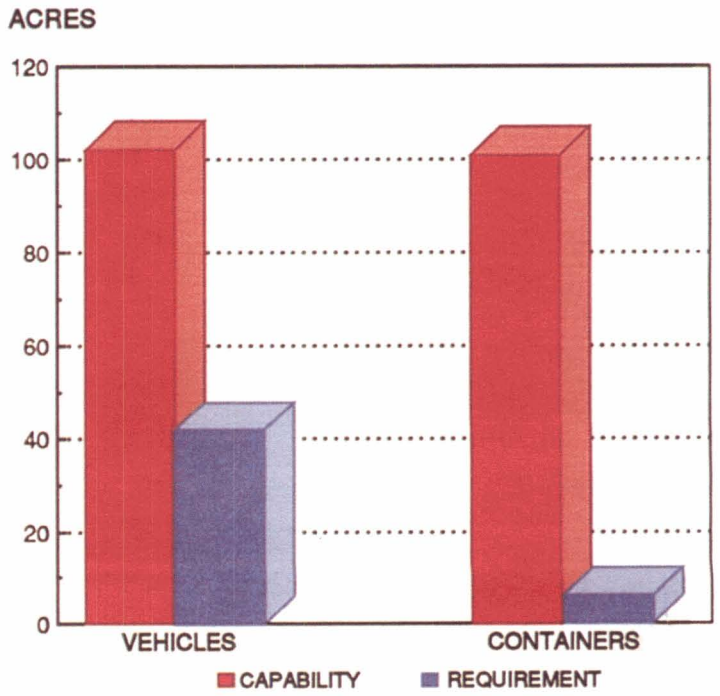
RAIL INPROCESSING/HANDLING CAPABILITY



STAGING

Combined, the Port of Oakland and MPC have about 210 acres of open storage area that could be assigned for military operations. We estimate that a mechanized infantry division needs about 48 acres of open staging to support the concurrent sustained loading of three FSS vessels. Divided between vehicles and containers, the staging area requirement for containers and vehicles becomes 6 and 42 acres, respectively.

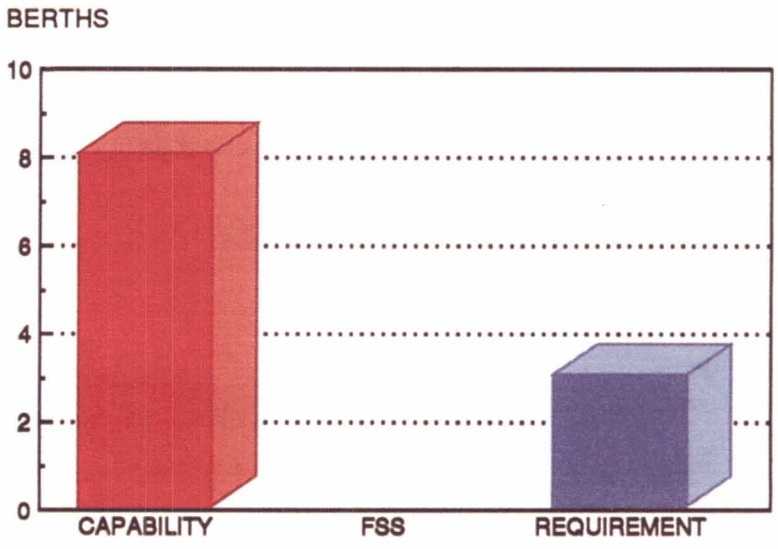
OPEN STAGING CAPABILITY



SHIPPING

The number of ships needed to load this requirement depends on the shipping mix selected. The best ship mix would require all eight FSS's and two Cape H RORO ships. The MARAD *Planning Orders Digest* designates eight ship berths that are compatible with FSS vessels. Assuming 2 days to load a ship, a division can easily outload within the 6-day requirement. We estimate a division can outload from the Port of Oakland in about 4 days.

FSS SHIPPING CAPABILITY



UNIT MOVEMENT REQUIREMENTS
MECHANIZED DIVISION

LOADING CONDITION/ SAMPLE SHIP MIX	*VESSEL TYPES*			
	FSS (RORO/COMB)	**CAPE H (RORO/COMB)**	**C3/C4 (BREAKBULK)**	**C6/C7/C8 (CONTAINER)**
Minimum Containerization				
All FSS*	8.00	1.90		
FSS and Cape H	6.64	3.00		
All Breakbulk			37.70	
Maximum Containerization				
FSS and Container	7.90			2.00
FSS, Cape H, and Container	4.62	3.00		2.00
Breakbulk and Container			29.58	2.00

*Only 8 FSSs are available. Unit shipping requirements exceed the capacity of these 8 vessels. Other vessel types are required to make up the FSS shortfall (Cape H).

Legend:

RORO - roll on/roll off

FSS - fast sealift ship

Source: MTMCTEA Report OA 90-4f-22, Deployment Planning Guide, Aug 91.

SUMMARY

The Port of Oakland and MPC can outload a mechanized infantry division within the 6-day outloading requirement.

For all except one terminal (Bay Bridge Terminal), the shipping subsystem is the limiting subsystem. For the Bay Bridge Terminal, the terminal handling capability is the limiting subsystem.

Deployment plans show that 1,557,737 MTON of cargo will flow through the Port of Oakland and MPC over a 69-day period. Pier 7 at MPC can handle the daily average of 22,576 MTON per day by itself. The Port of Oakland facilities can be used during peak periods.

RECOMMENDATIONS

We recommend the Port of Oakland as a potential port for outloading a mechanized infantry division within 6 days.

We recommend 48 acres of adjacent open staging area be designated to support the concurrent sustained loading of three FSS vessels.