



Megaships – An Overview

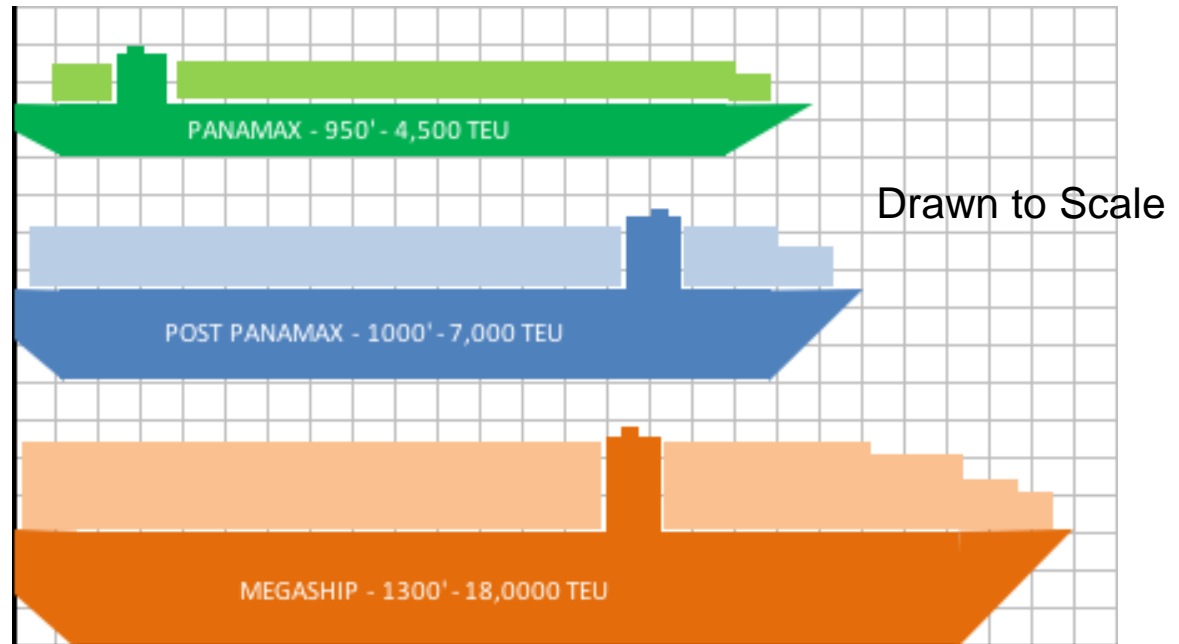
NEDC Ports & Goods Movement Workgroup

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What is a Megaship?

Megaships are larger in all dimensions than “Post Panamax” or “NeoPanamax” vessels.

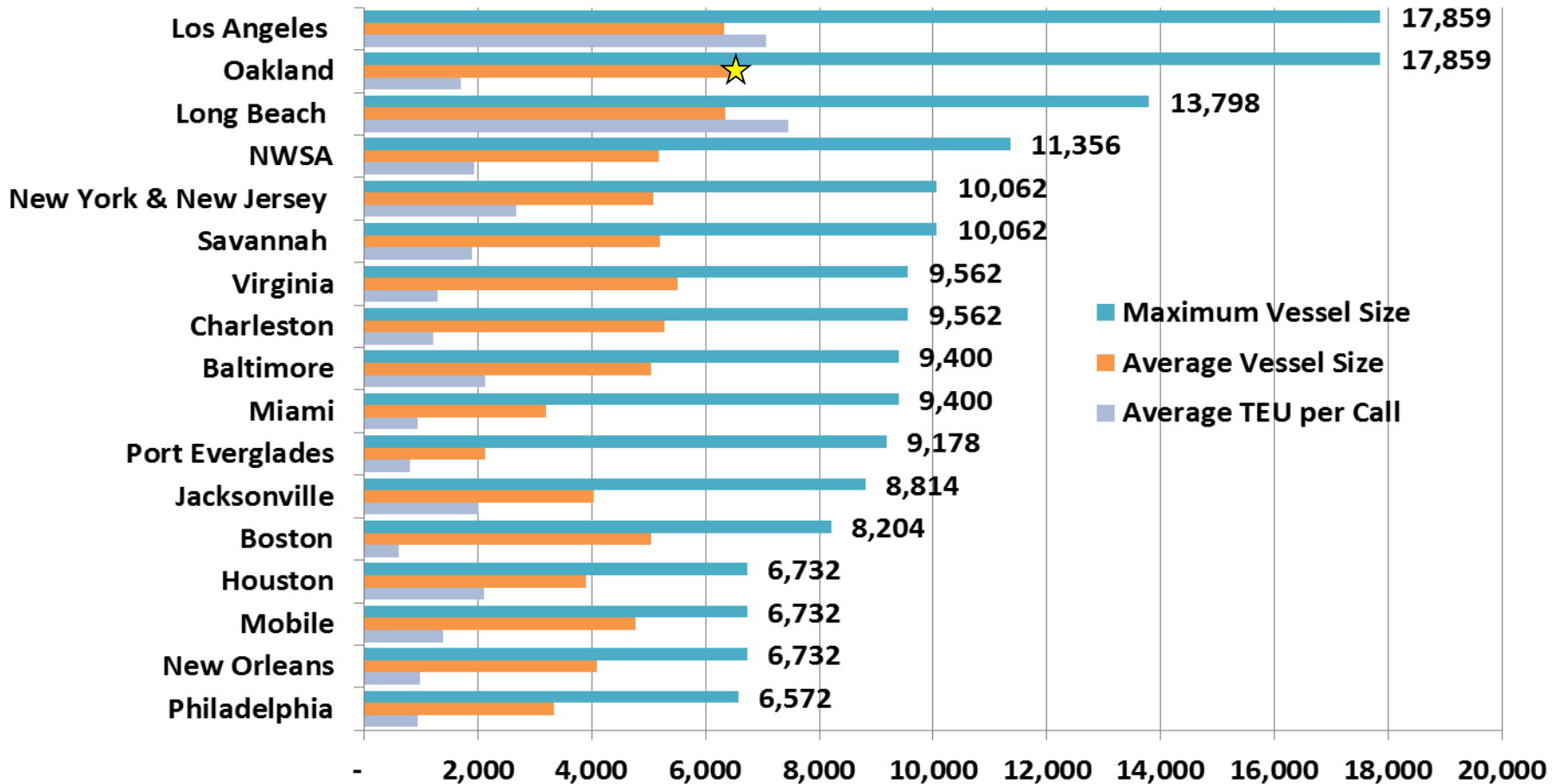


Vessel	TEU Capacity	Containers Across	Containers Above/Below Deck	Draft Feet	Beam Feet	Air Draft Feet	LOA Feet	Berth Feet
Panamax	4,000	15	5/6	40	105	117	950	1,055
Post-Panamax	7,000	17	6/9	49	141	138	1,000	1,141
Post-Panamax	9,000	19	6/9	50	158	159	1,200	1,358
NeoPanamax	13,000	20	6/10	50	161	164	1,200	1,361
Megaship	18,000	23	9/10	52	193	187	1,300	1,493

“Bigger than what you are used to”

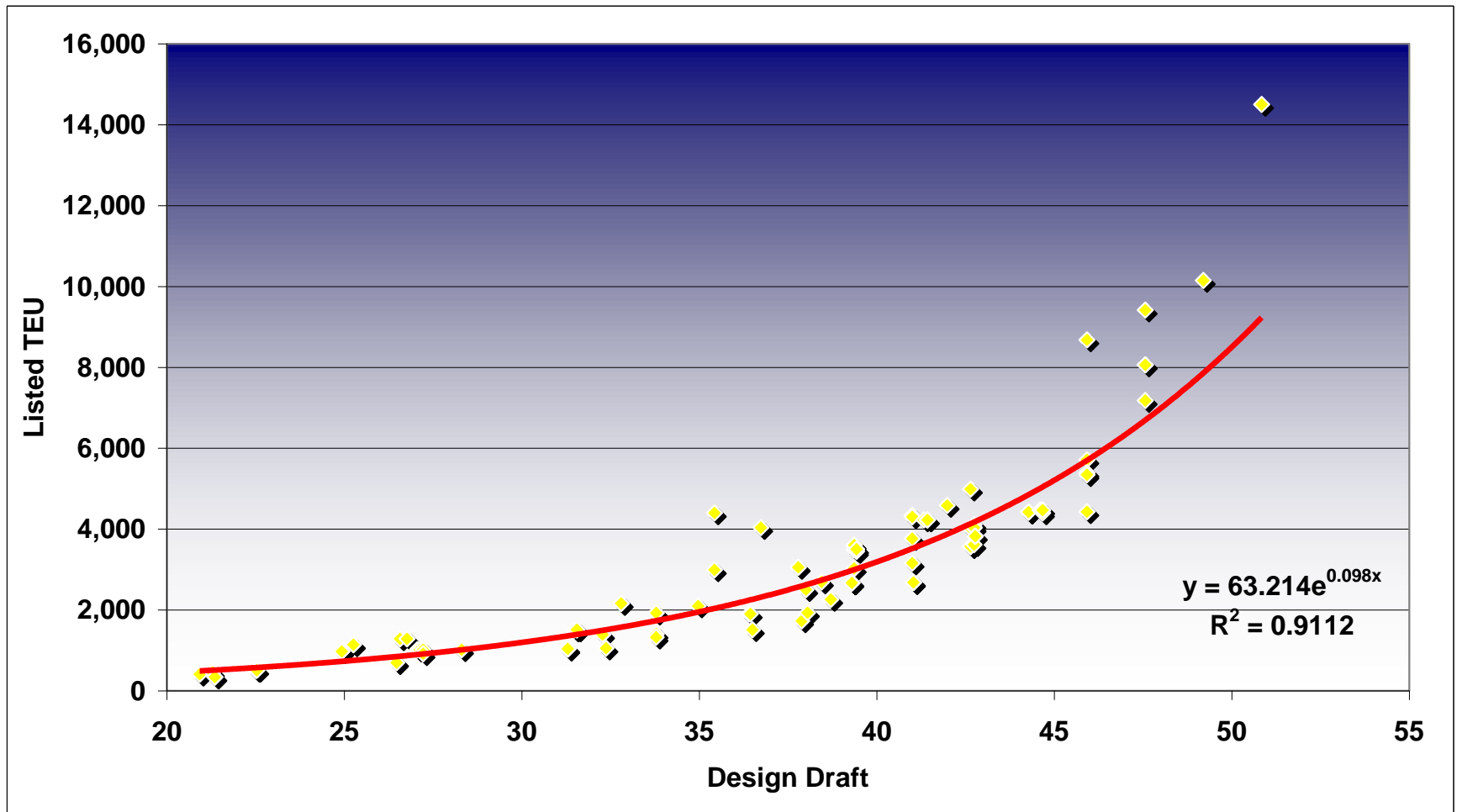


2015 Vessel Sizes at U.S. Ports



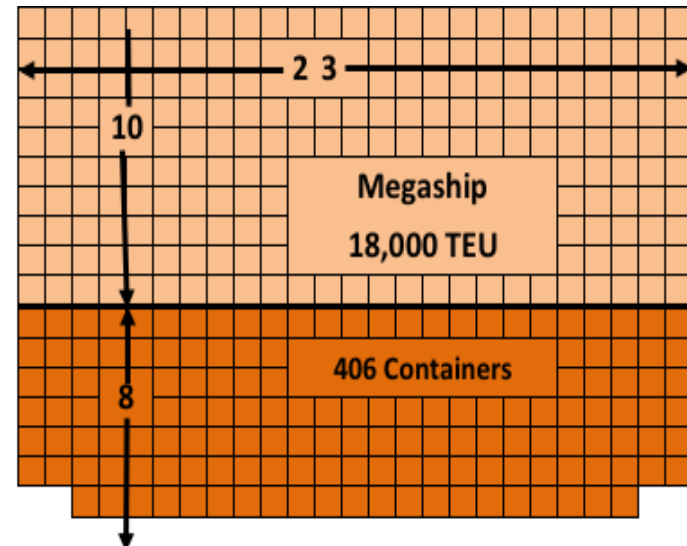
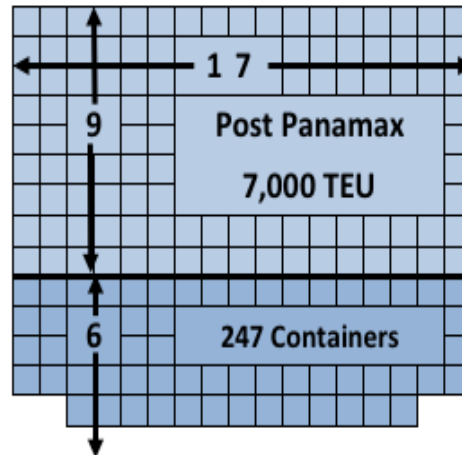
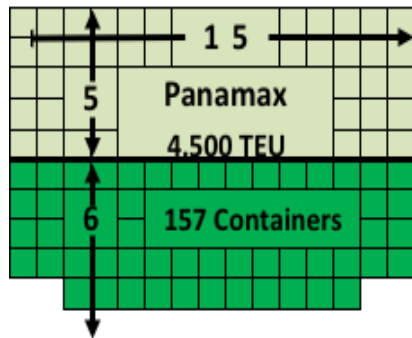
Note: the 17,859 TEU calls were the CMA/CGM Benjamin Franklin in December 2015

Megaship designs depart from past practice by limiting draft to 50-52 feet

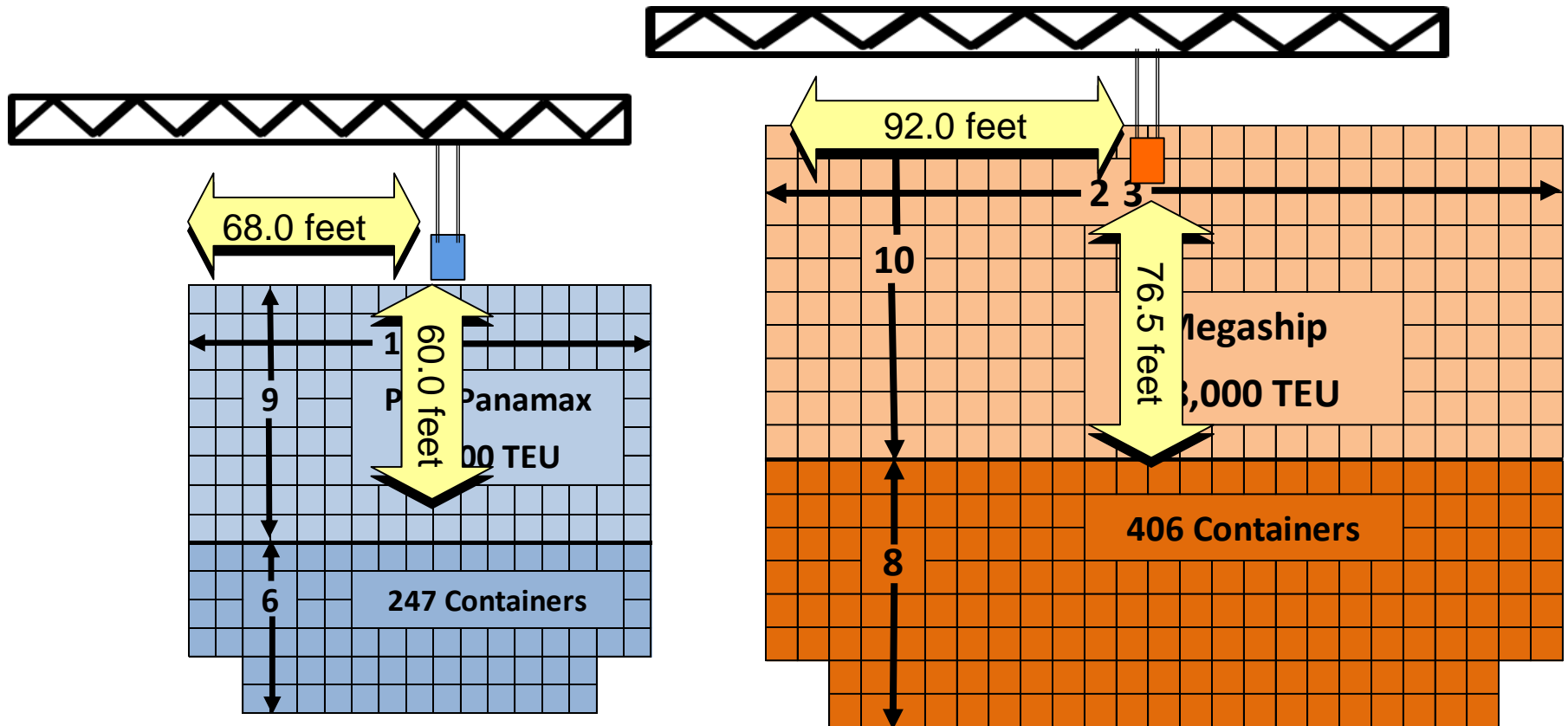


Megaship beam and height mean:

- About 64% more containers in the largest cargo bay than Post Panamax vessels
- About 133% more containers in the largest cargo bay than Panamax vessels



On average, cranes must move containers farther on each cycle to serve megaships



Megaships double or triple TEU per foot of berth

Vessel	TEU Capacity	Vessel LOA Feet	Vessel Beam Feet	Berth Feet Required	Port TEU @ 35% (East/Gulf)	TEU per Foot	Port TEU @ 73% (West)	TEU per Foot
Panamax	4,000	950	105	1,055	1,400	1.3	2,920	2.8
Post-Panamax	7,000	1000	141	1,141	2,450	2.1	5,110	4.5
Post-Panamax	9,000	1200	158	1,358	3,150	2.3	6,570	4.8
NeoPanamax	13,000	1200	161	1,361	4,550	3.3	9,490	7.0
Megaship	18,000	1300	193	1,493	6,300	4.2	13,140	8.8

Panamax
4000 TEU 950ft LOA 105ft beam

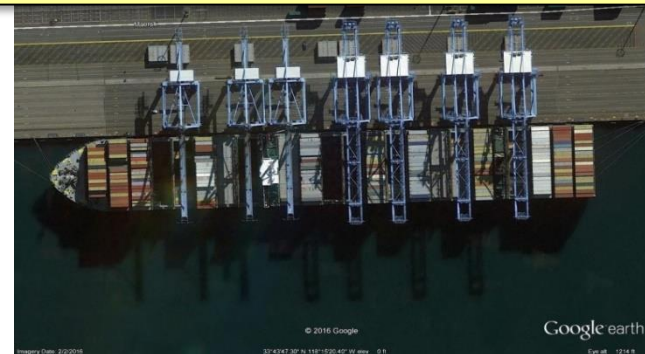
Post Panamax
7000 TEU 985ft LOA 141ft beam

Megaship
18000 TEU 1300ft LOA 193ft beam

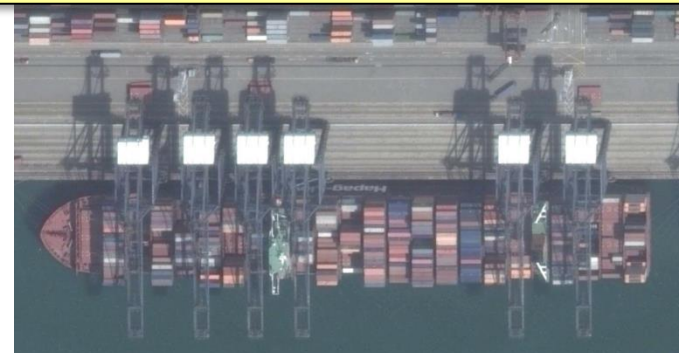
Megaships require 1500ft berths and 4-7 cranes per vessel

Port	Berth Length	1500ft "Berths"	SPP Cranes	SPP Cranes per 1500ft "Berth"
New York & New Jersey	28,321	19	13	0.7
Long Beach	28,179	19	43	2.3
Los Angeles	27,429	18	48	2.6
NWSA (Sea-Tac)	21,727	14	26	1.8
Oakland	18,674	12	2	0.2
Miami	16,500	11	0	-
Virginia	13,375	9	28	3.1
Jacksonville	12,182	8	0	-
Charleston	9,800	7	12	1.8
Savannah	9,693	6	16	2.5
Houston	9,300	6	7	1.1
Philadelphia	7,622	5	0	-
Port Everglades	6,928	5	0	-
Baltimore	4,352	3	4	1.4
Wilmington (NC)	2,620	2	0	-
New Orleans	2,000	1	0	-

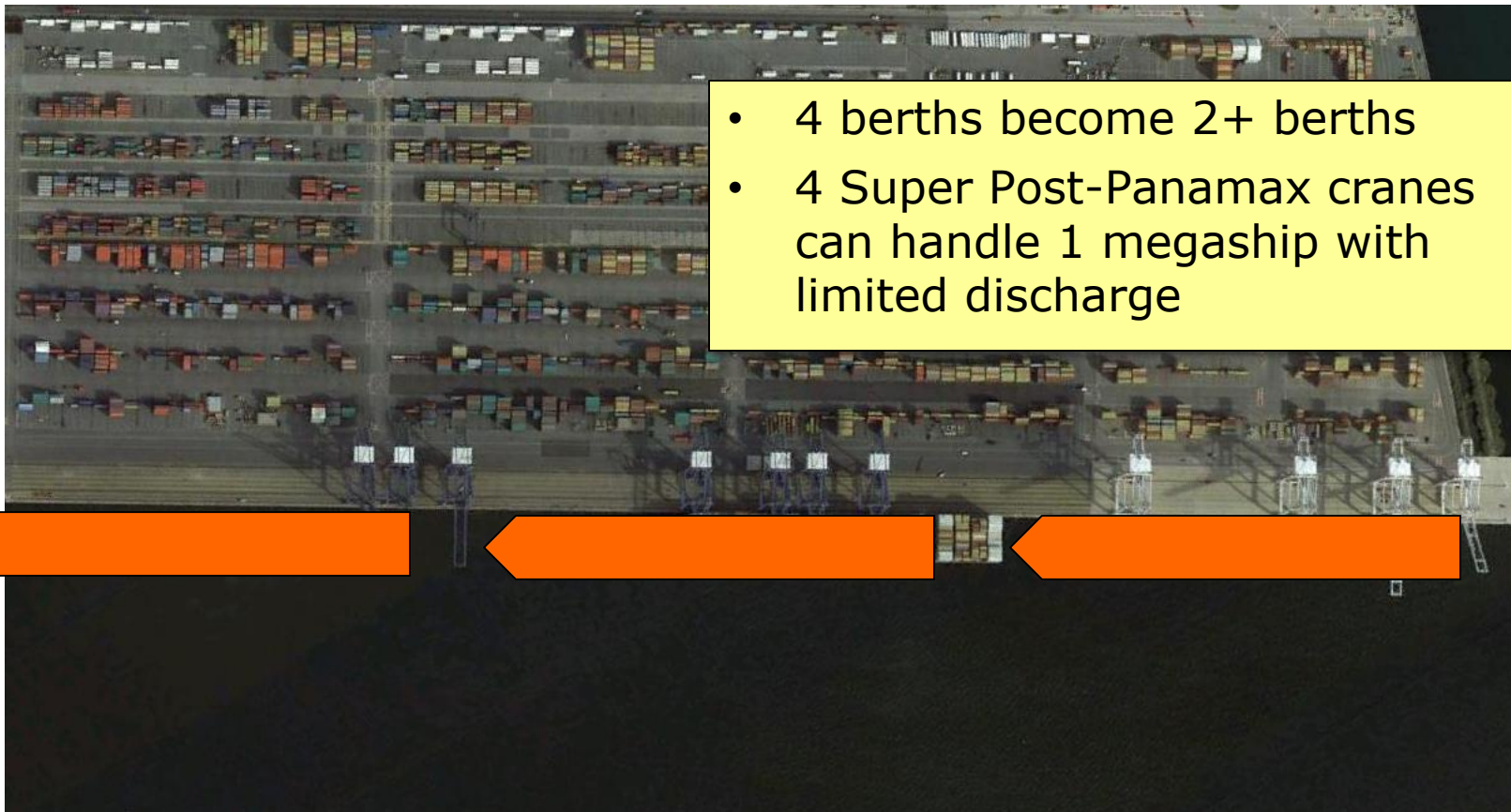
LA: 7 cranes on 1200ft ship



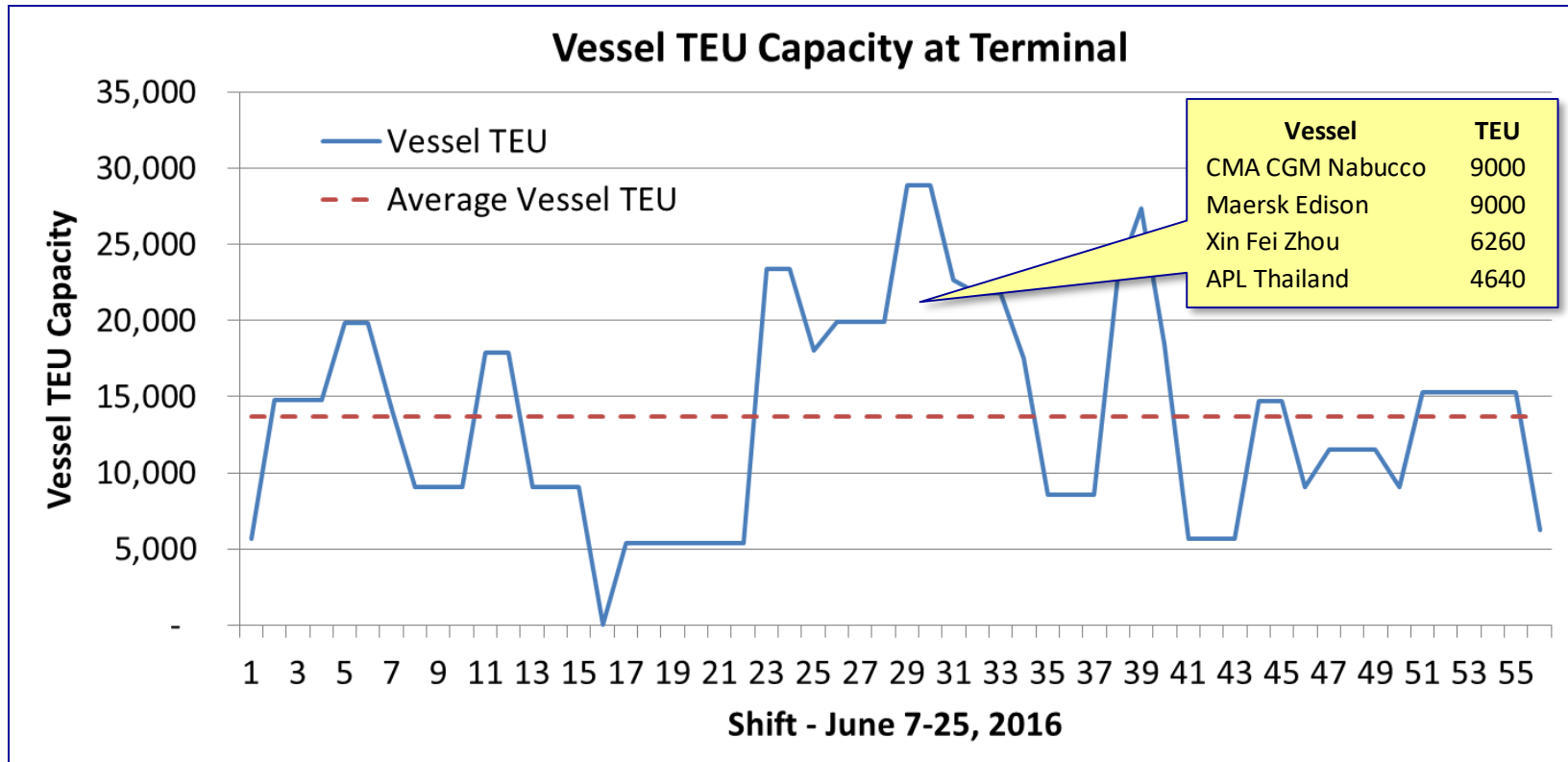
Yantian: 6 cranes on 1200ft ship



- 4350ft wharf face = 4 berths
- 7 Post-Panamax cranes (18 containers wide)
- 4 Super Post-Panamax cranes (22 containers wide)



At multi-berth terminals, arrival of multiple large vessels causes daily and weekly cargo peaking



Example: APM Los Angeles, 5 berths & 14 Super Post-Panamax cranes



Mega-ship Handling Puzzle



NAVIS Code/KE Code Line Operator Name	20ft Standard Dry Box	40ft Standard Dry Box	40ft High Cube Dry Box	45ft	Reefer	All other sizes/types
ALI/AI ALIANCA LINES INC	PPCY	PPCY	PPCY	NNIT	SNIT	SNIT
APL/AF			Y	SNIT	INELIGIBLE	SNIT
ACL/AI			Y	SNIT	SNIT	SNIT
ANL/AI			T	VIG	VIG	INELIGIBLE
COS/CE				VIG	VIG	VIG
CHS/CS				VIG	VIG	VIG
CMA/CM			T	VIG	VIG	INELIGIBLE
CSA/CV				IGIBLE	INELIGIBLE	INELIGIBLE
EDM/ED			Y	INELIGIBLE	SNIT	SNIT
EVG/EY			Y	VIG	VIG	VIG
HSD/CO			Y	PMT	NNIT	SNIT
HJS/HJ			Y	VIG	VIG	VIG
HLP/HP			Y	NNIT	INELIGIBLE	NNIT
HYU/HY			Y	NNIT	NNIT	SNIT
KLK/KL			Y	VIG	VIG	VIG
MSK/MS MAERSK INC	VIG	PPCY	VIG	PPCY	VIG	VIG
MSC/MD MEDITERRANEAN SHIPPING	VIG	VIG	PPCY	VIG	VIG	VIG
MOL/MI MOL AMERICA INC	SNIT					
CPL/PA MONTEMAR/LIBRA	INELIGIBLE					
NYK/NY NYK LINE	SNIT					
OOCL/OOCL (USA) INC	SNIT					
SCL/SA SAFMARINE LTD % MAERSK	VIG					
SLN/SY SCHUYLER LINE NAVIGATION CO	PPCY					
SEA/SL SEALAND	VIG					
TUR/TR TURKON LINE	PPCY					
UAS/UA UNITED ARAB SHIPPING COMPANY	PPCY					
YML/MY YANG MING AMERICA	VIG					
ZIM/MZ ZIM INTEGRATED SHIPPING SERVIC	SNIT					

Sample Port of Virginia Empty Container Return Matrix

- 4 return locations
- 6 container types
- 28 shipping lines
- Reissued every day

LINE	20 ST	40 ST	40 HC	45	REEFERS	SPCL EQPT
APL	YES	YES	YES	YES	YES	YES
CMA CGM	YES	YES	YES	YES	YES	YES
Cosco (COS)	NO	NO	NO	NO	NO	NO
Hapag Lloyd (HLC)	NO	NO	NO	NO	NO	NO
Hyundai (HMM)	NO	NO	NO	NO	NO	NO
Hamburg Sud (HSD)	YES	YES	YES	YES	YES	YES
Maersk (MAE)	NO	NO	NO	NO	NO	NO
Mitsui (MOL)	YES	YES	YES	YES	YES	YES
NYK	YES	YES	YES	YES	YES	YES
OOCL	NO	NO	NO	NO	NO	NO
United Arab Shipping (UAS)	YES	YES	YES	YES	YES	YES

Sample LA Pier 300 Empty Container Return Matrix

- 1 of 13 LA-LB Terminals
- 6 container types
- 11 shipping lines
- Reissued every shift

How do...

- Megaship dimensions
- Megaship volumes
- Megaship surges
- Megaship complexity

...affect terminals, ports, and inland transport?

How do we cope in the near term?

How do we plan for the long term?

What must port authorities, regional planners, and state DOTs do to capture megaship benefits and minimize problems?

How do we justify, prioritize, and fund...

- Port improvements?
- Operational and information advances?
- Regional infrastructure?

How do we adjust to changing port traffic patterns?

How do we mitigate congestion and emissions impacts?

What regional, state, and national policy or program changes might be needed?