Berth Productivity

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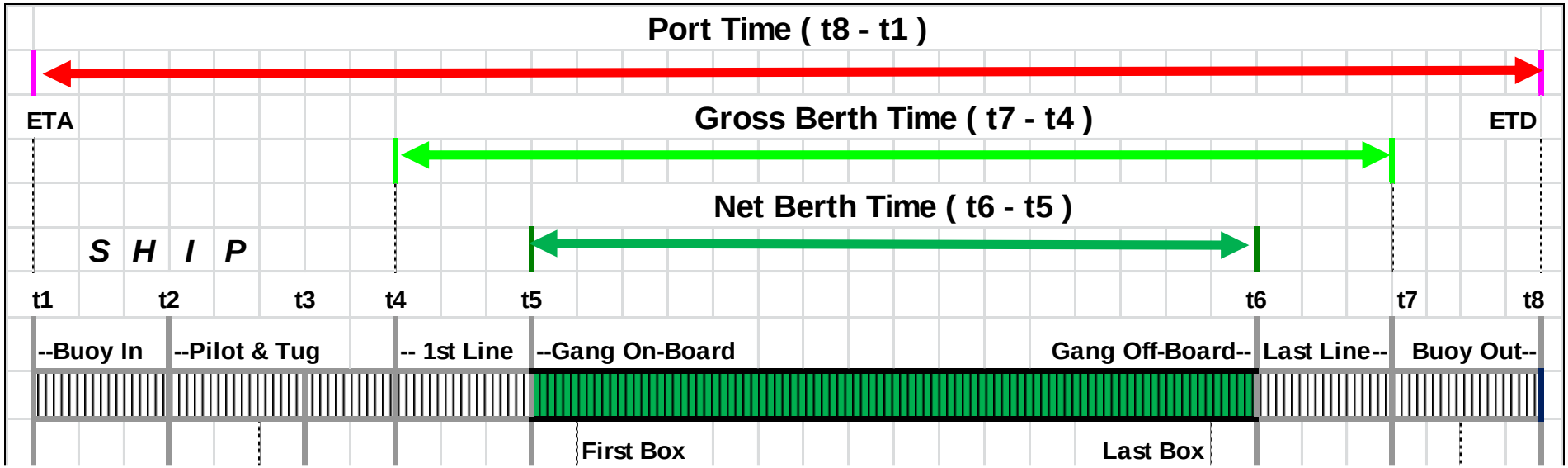
Agenda

- ***Definition*** of Moves and Hours
- Ship / Gang Chart
- Berth and Crane ***Productivity Indicators***
- ***Factors*** Affecting Berth Productivity
- Productivity and ***Capacity***
- ***Public Interest***

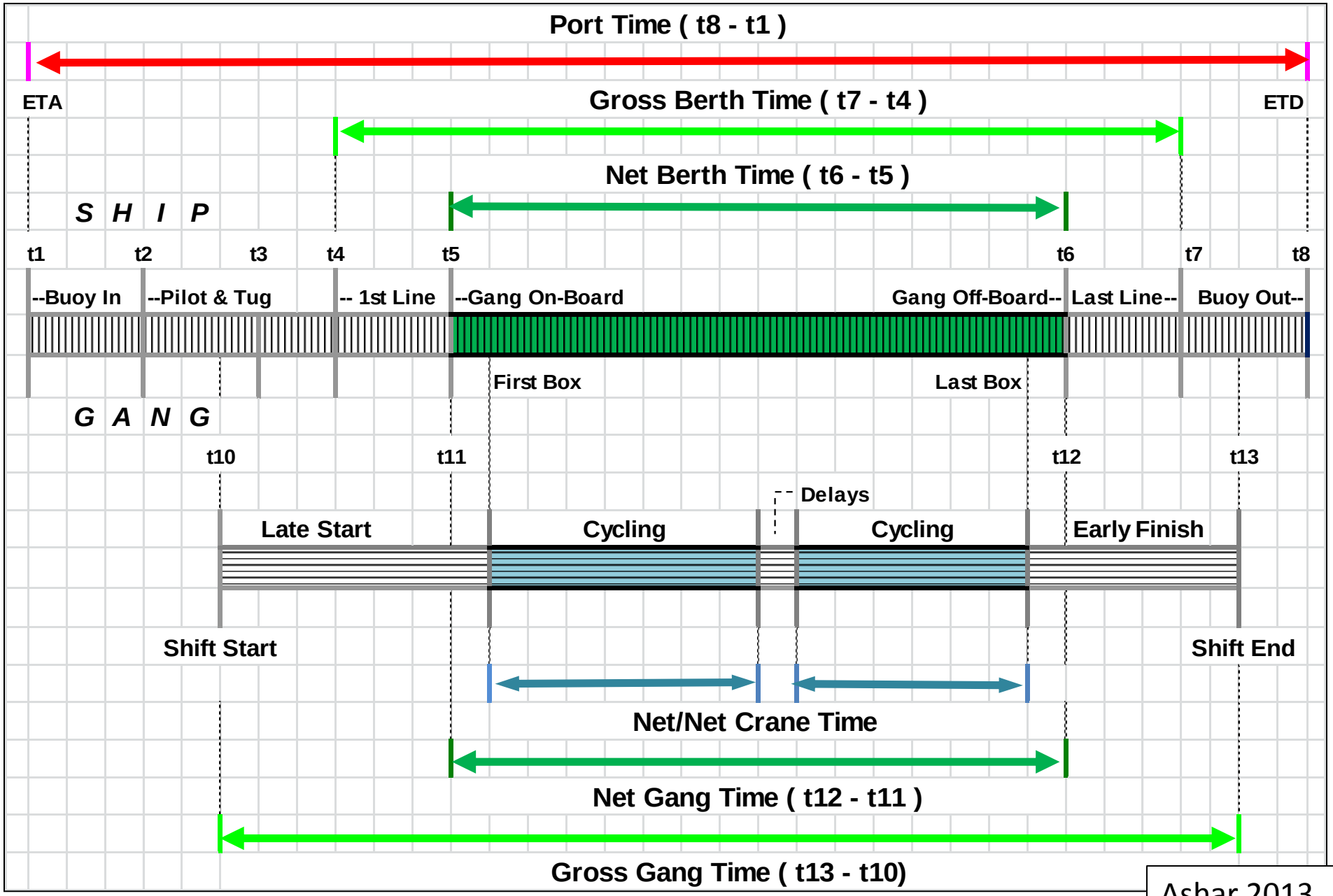
Moves per Hour?

- Moves:
  - ***Productive Moves*** – Crane Cycle ("Lift"), Multiple-Box Lifting, Dual Cycling
  - ***Unproductive Moves*** – Hatchcover, Re-Handling
- Berth (Ship?) Hour:
  - ***Productive Hours*** – Crane Cycling
  - ***Unproductive Hours*** – During Ship's Berth Time; Between Ships
  - Three-level separation of times, based on controllability and cost: ***Gross, Net, Net-Net Productivities***

Ship / Gang Time-Chart



Ship / Gang Time-Chart



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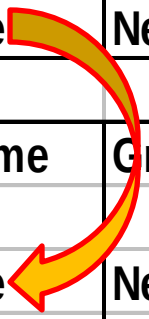
Berth and Gang Indicators

	Activity	Time Definitions	Productivity Definitions
	Buoy-to-buoy	Port Time	
Ship	First-to-last line	Gross Berth Time	Gross Berth Productivity
	First-to-last box	Net Berth Time	Net Berth Productivity
	Assigned (available,paid)	Gross Gang Time	Gross Gang Productivity
Gang	Working (first-to-last box)	Net Gang Time	Net Gang Productivity
	Box handling	Net Net Gang Time	Net-Net Gang Prod. ("pick rate")



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Factor Affecting Productivity

- Traffic Composition: Domestic vs. Transshipment
- Ship and Call Size, Stowage Plan, Order in Rotation
- Terminal Layout and Equipment
- Labor Contract (Shift Structure, Meals, Relief)
- ***Labor Proficiency & Motivation*** (Incentive Program, Automation)

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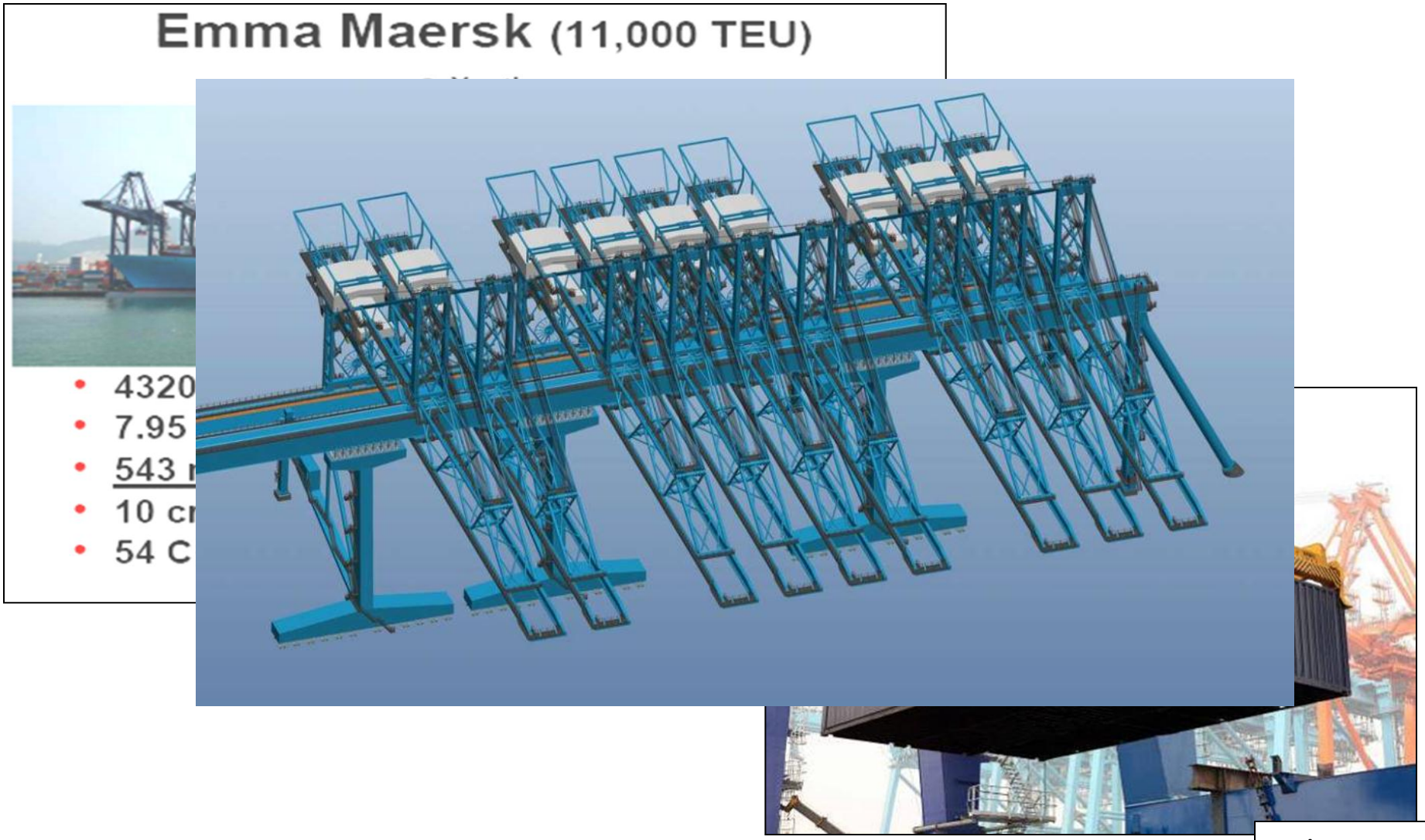
Crane Technology & Density



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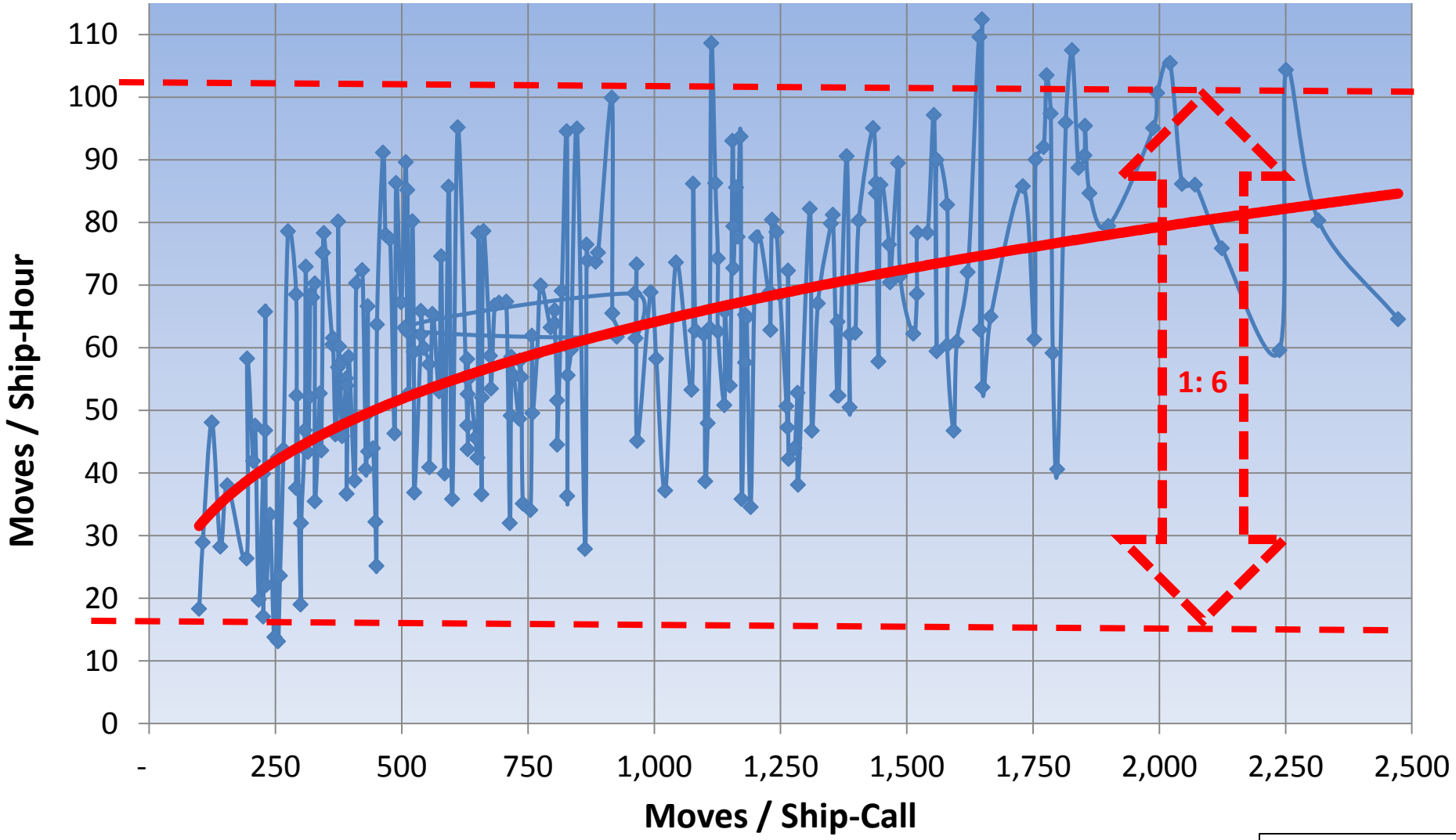
Berth Productivity = f (Call Size)



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Productivity, Utilization and Capacity

Berth Productivity *(Moves/Hour)* =

Crane Productivity (Moves/Hour) x Crane Density

Berth Capacity *(TEUs/Year)* =

Berth Productivity (Moves/Hour) x TEUs/Move x

Berth Utilization (%) x 24 x 365

Berth Utilization vs. Terminal Cost vs. Ship's Waiting

Berth Capacity Indicators

Year	Type of Berth	Berth Length (m)	Depth Alongside (m)	Berths per Terminal	Design Ship	Berth Capacity (TEUs)	Berth-m Capacity (TEUs/m)
2009	Sub Panamax	250	12	3	3,000	350,000	1,400
2012	Panamax	280	14	3	4,500	450,000	1,607
2012	Panamax	280	14	4	4,500	495,000	1,768
2014	Post Panamax I	300	15	3	5,700	500,000	1,667
2014	Post Panamax I	300	15	4	5,700	550,000	1,833
2017	Post Panamax II	350	16	4	8,000	700,000	2,000
2025	Post Panamax III	400	16 - 18	4	12,000	1,000,000	2,500
2009	Multipurpose	150	10 - 11	2	1,000	100,000	667

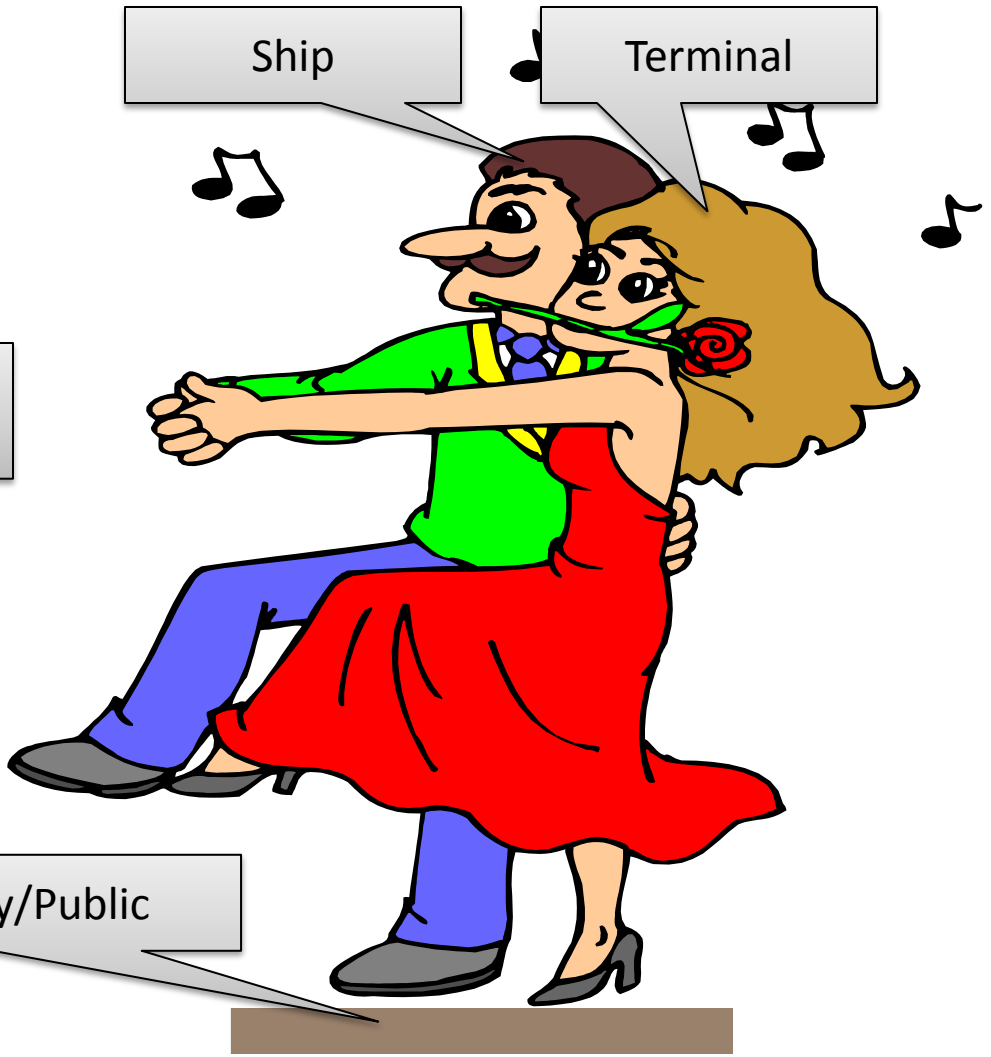
Source: A. Ashar, NPWI 2009

Public Interest

- Terminal Cost = f(Productivity); ***Competition***
- Capacity = f(Productivity); ***Planning***
- Use of ***scarce*** waterfront land
- Public money, especially land and water access; Externalities
- MPH too crude; Needs to be better specified and Expanded
- Need for ***national/international productivity databases***
- Competition vs. Cooperation

Trio: Ship, Terminal & Port Authority

Each party has its own interest – but share interest in productivity



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Thank you!

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