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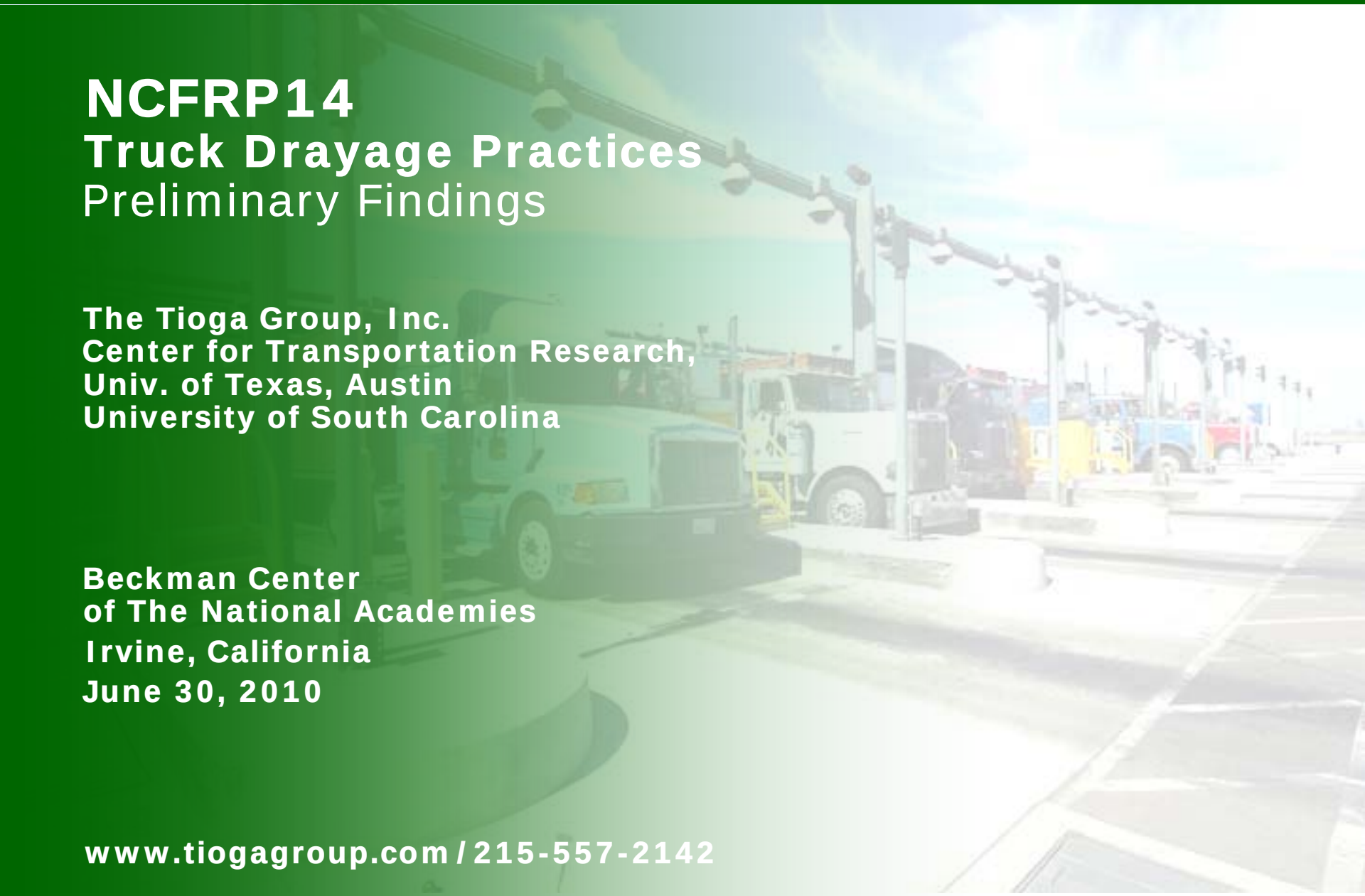
NCFRP14
Truck Drayage Practices
Preliminary Findings



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Key questions

- Where are the bottlenecks and delays?
- What are the causes?
- What are the solutions?

Answers

- The terminal drayage bottlenecks are the gate, CY, and chassis pool
- The causes are congestion and exceptions
- The solutions include terminal improvements, operating practices, and exception reductions

Candidate Bottlenecks & Best Practices

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Bottlenecks

- Peaking
- Gate queuing & processing
- Gate & terminal breaks
- CY congestion
- Chassis selection
- Trouble tickets
- Empty returns
- Legacy terminals
- “Inexperienced” drivers & trucking firms

Best Practices

- Two-stage gates with turnaround (or equiv.)
- Appointment systems
- Neutral chassis pools
- Trucker-provided chassis
- Use of port/terminal info systems
- Pre-clearance/PINs
- “Experienced” drivers & trucking firms

What is a Bottleneck? – Chassis Example

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- **Minimum time** – back onto kingpin, hook up brakes and lights, crank up sand shoes, and test everything – it can be done in 7 minutes
- **Planned time** – it can be done in 7 minutes, but we plan for 10 minutes when everything is going right
- **Congested time** – if other truckers are in the way, it can take up to 30 minutes to get in and out of the CY
- **Exception time** – If something is wrong with the chassis, it can take up to 90 minutes to get it fixed or flipped. (Typically 60 minutes extra)
- **Weighted average time** – 12 minutes

Marine Terminal Process –Example

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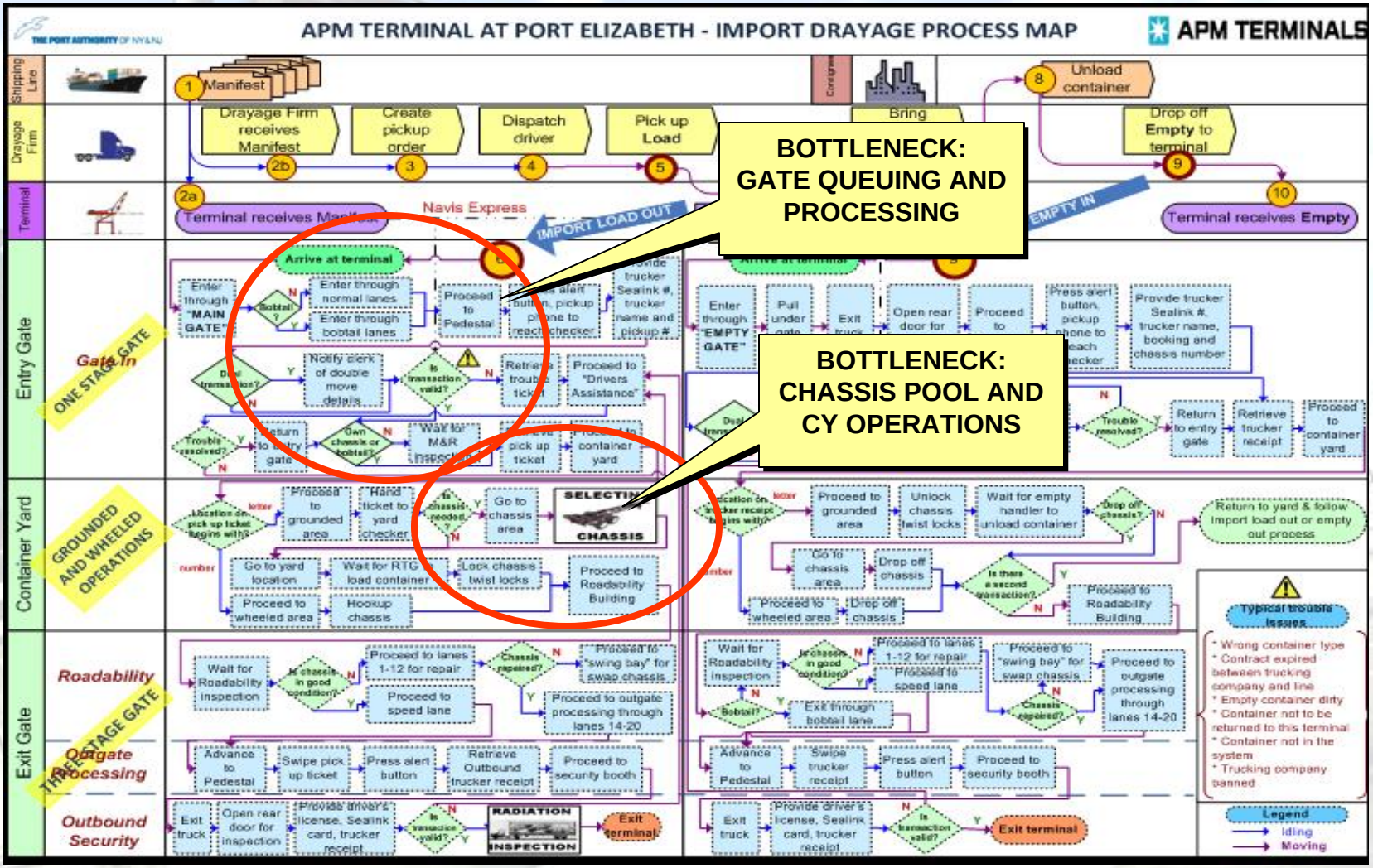

Peaking and Congestion – Idle Terminal

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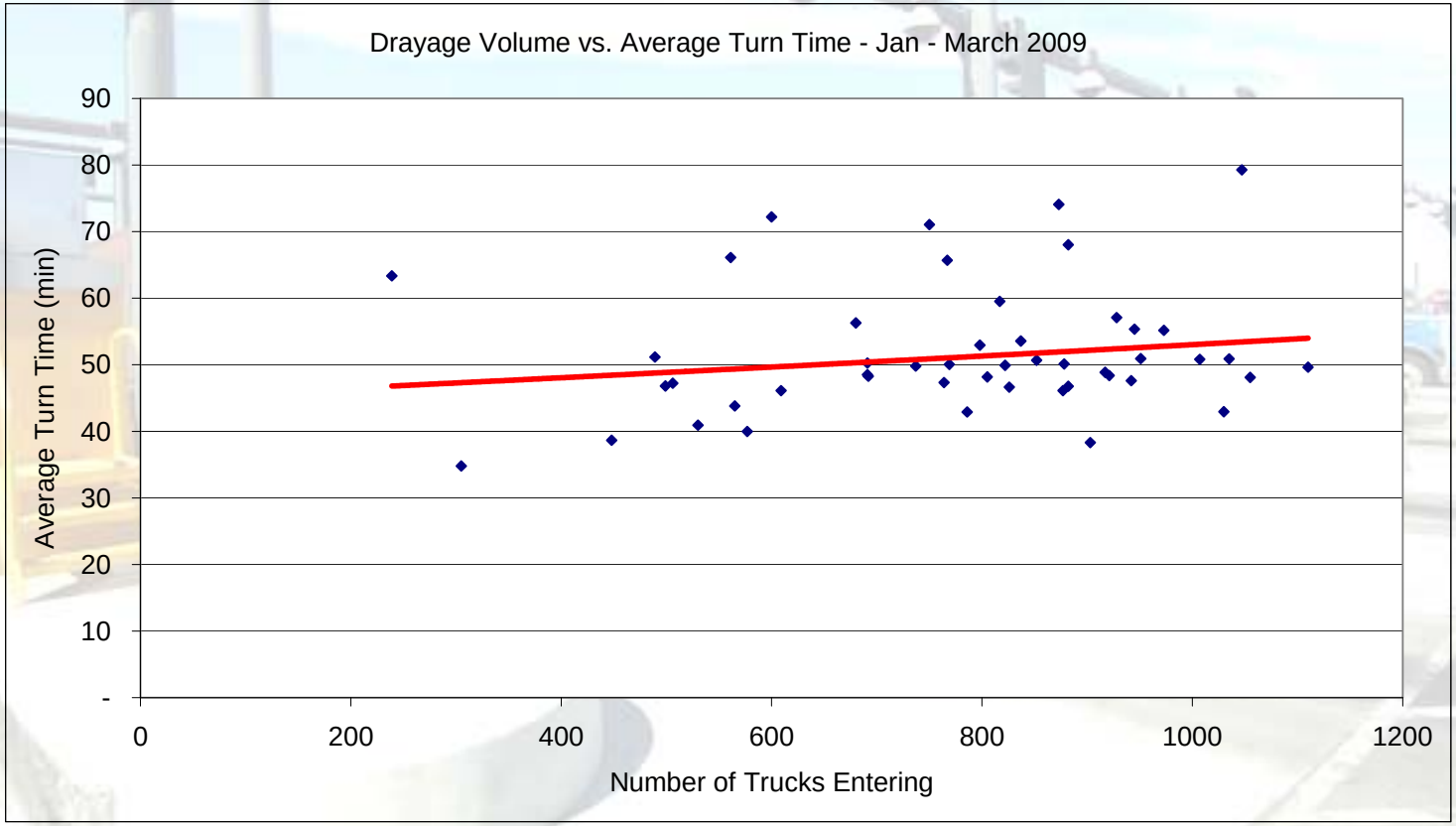
Terminal data (which exclude gate queues) show a mild increase in turn times up to 1100 daily truck trips



Peaking and Congestion – Busy Terminal

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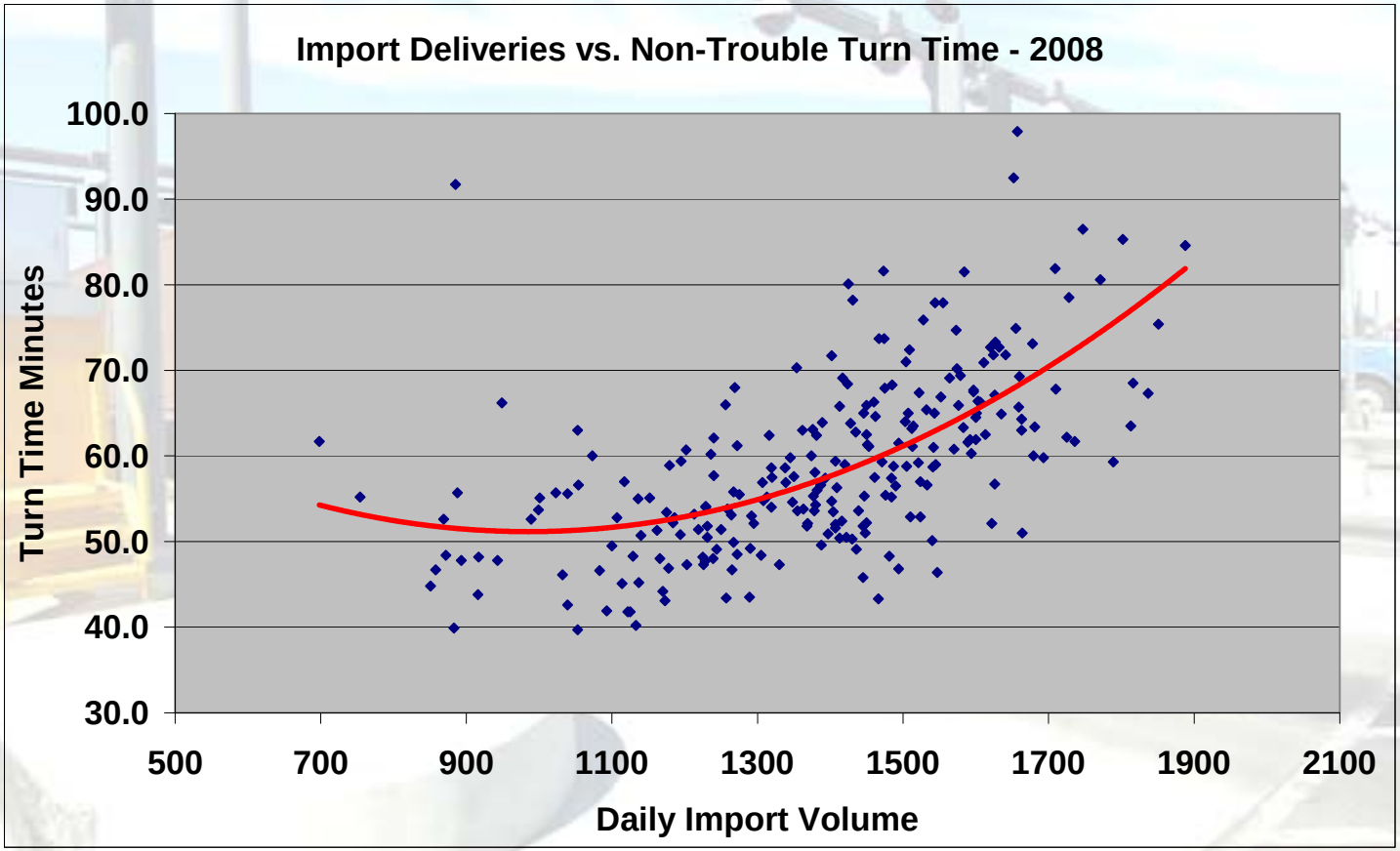
Terminal data (which exclude gate queues) show a strong increase in turn times above 1100 daily trips



Gate Queuing – Webcam Study Data

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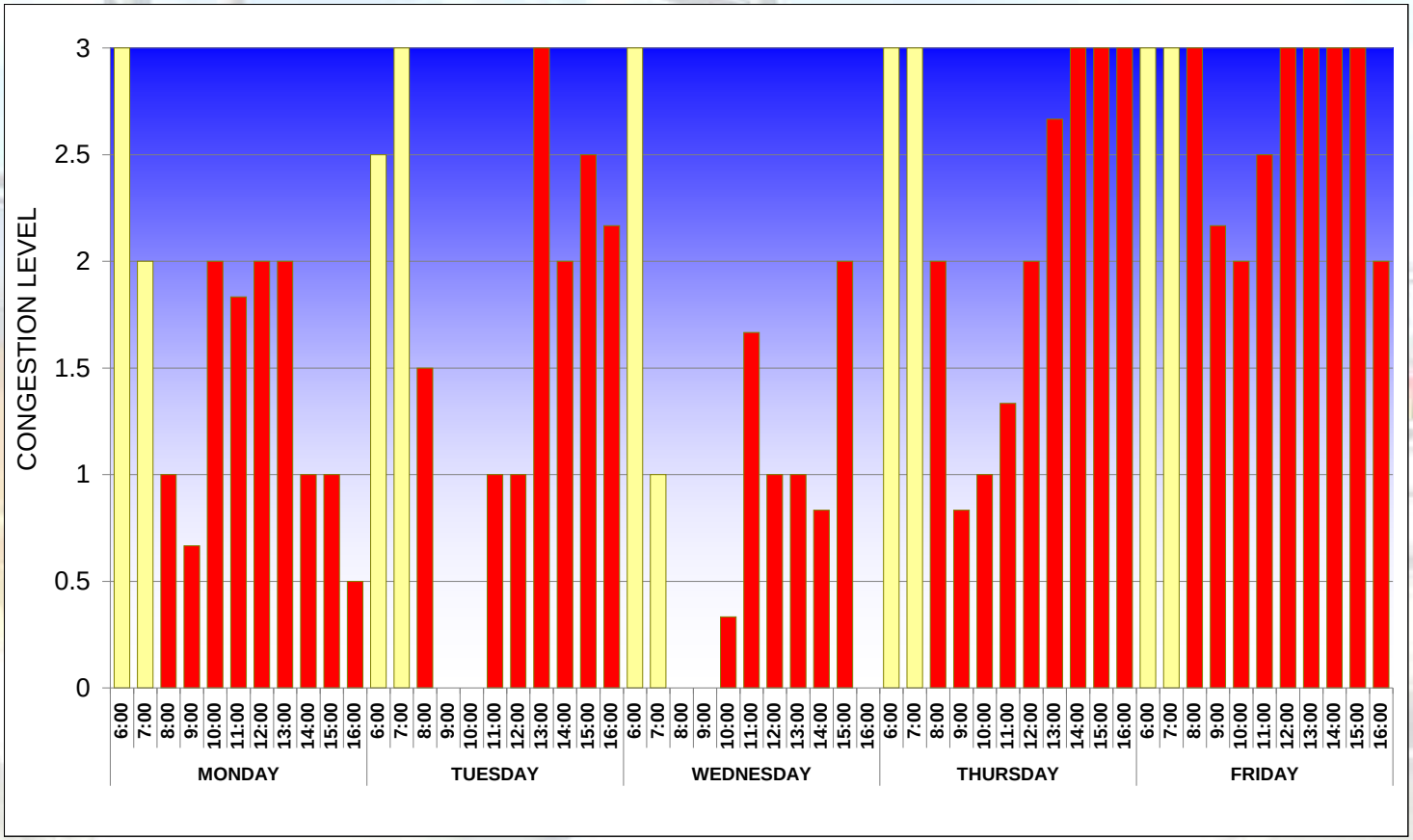
Long queues in the morning and for export cut-offs



Gate Processing – Webcam Study Data

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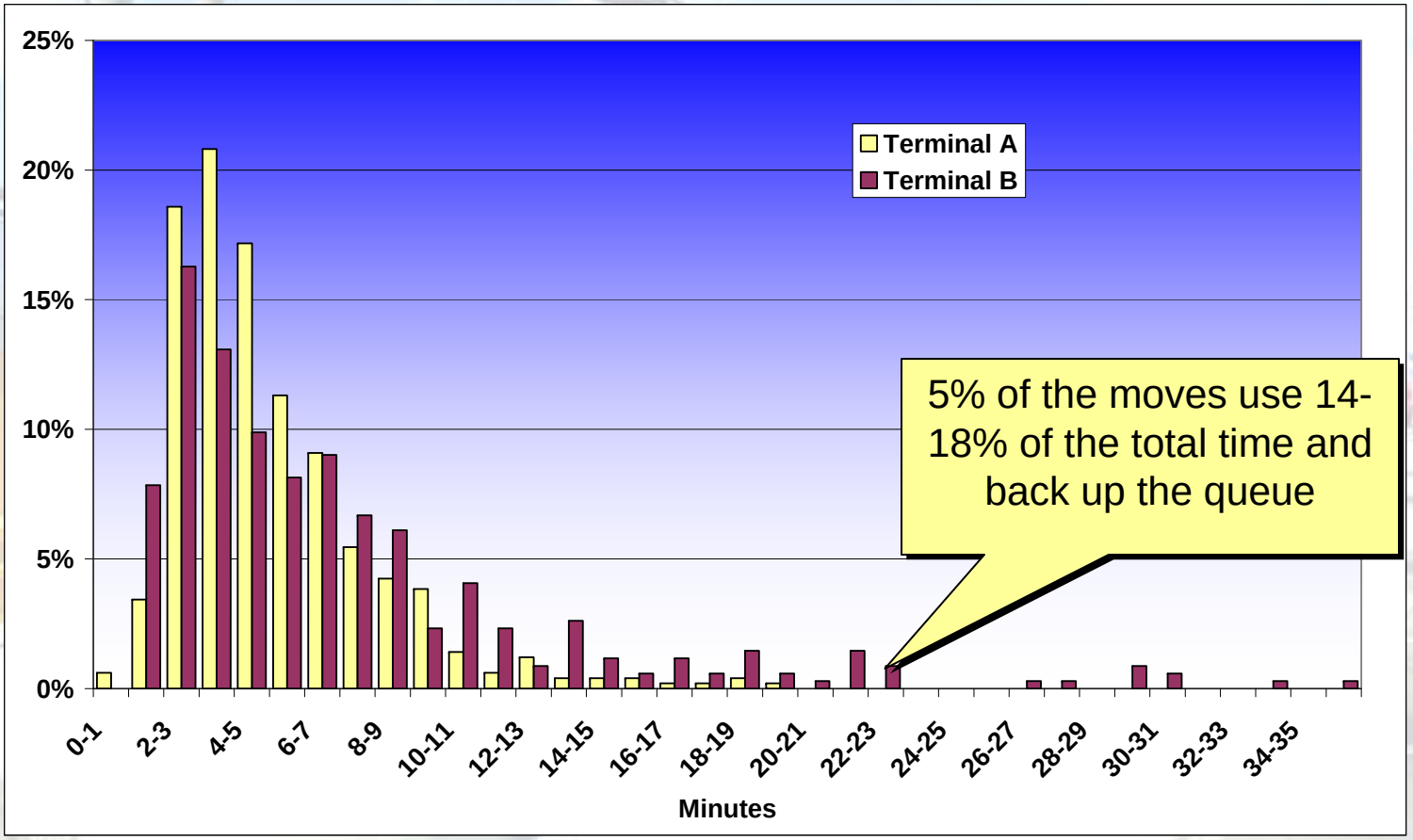
Distribution with a 5% "tail" of exceptions



Gate Processing Times- Qualcomm Data

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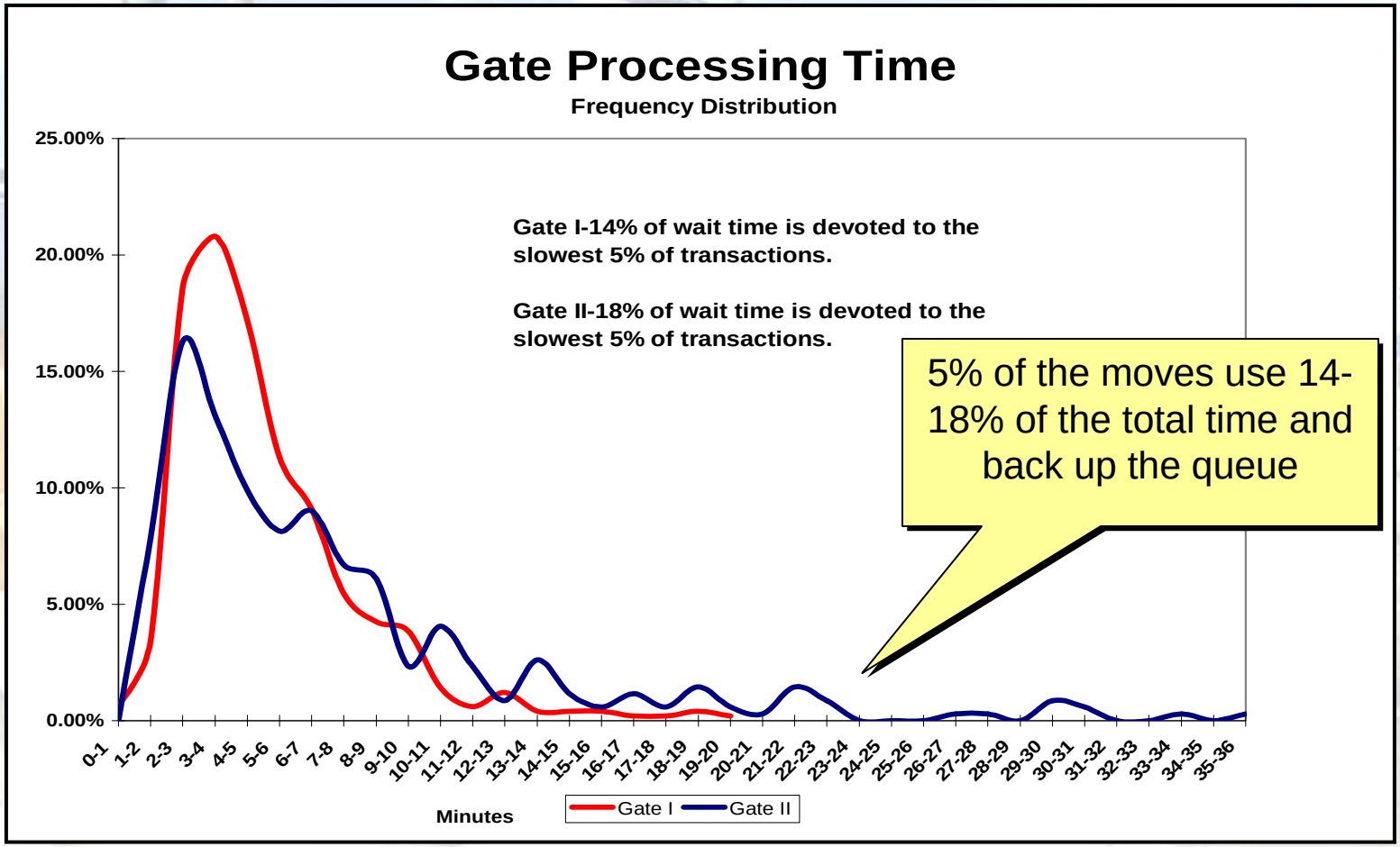
Again, a distribution with a 5% "tail" of exceptions



Turn Times – Terminal and Qualcomm Data

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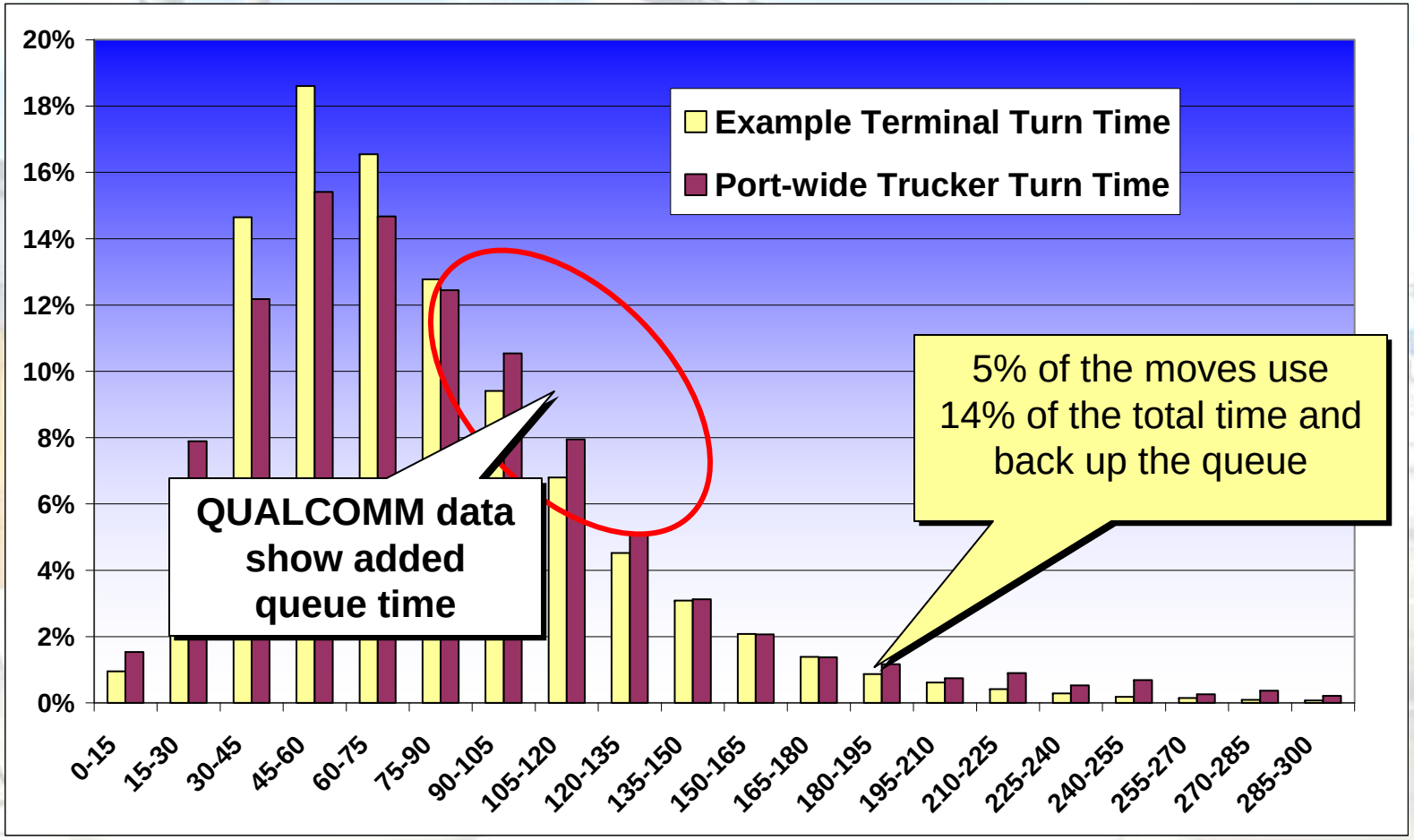
Still more 5% "tails"



Two-Stage Gate Process (or Equivalent)

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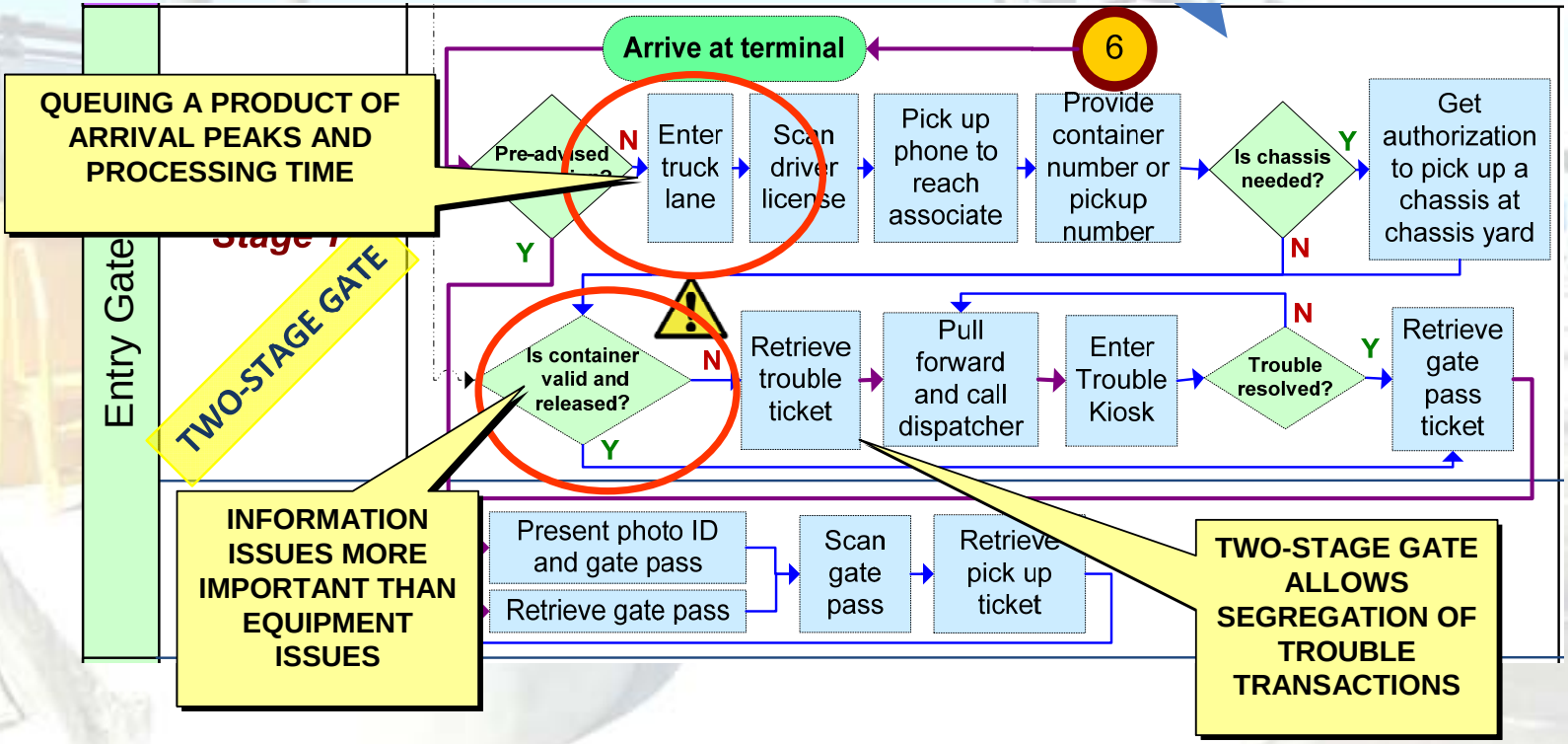
- **Gate processing time is typically 2-4 minutes, but 5% tail adds to the average turn time.**
- **Longer gate processing times create and exacerbate queuing**



Lunch Break Closures – Webcam Data

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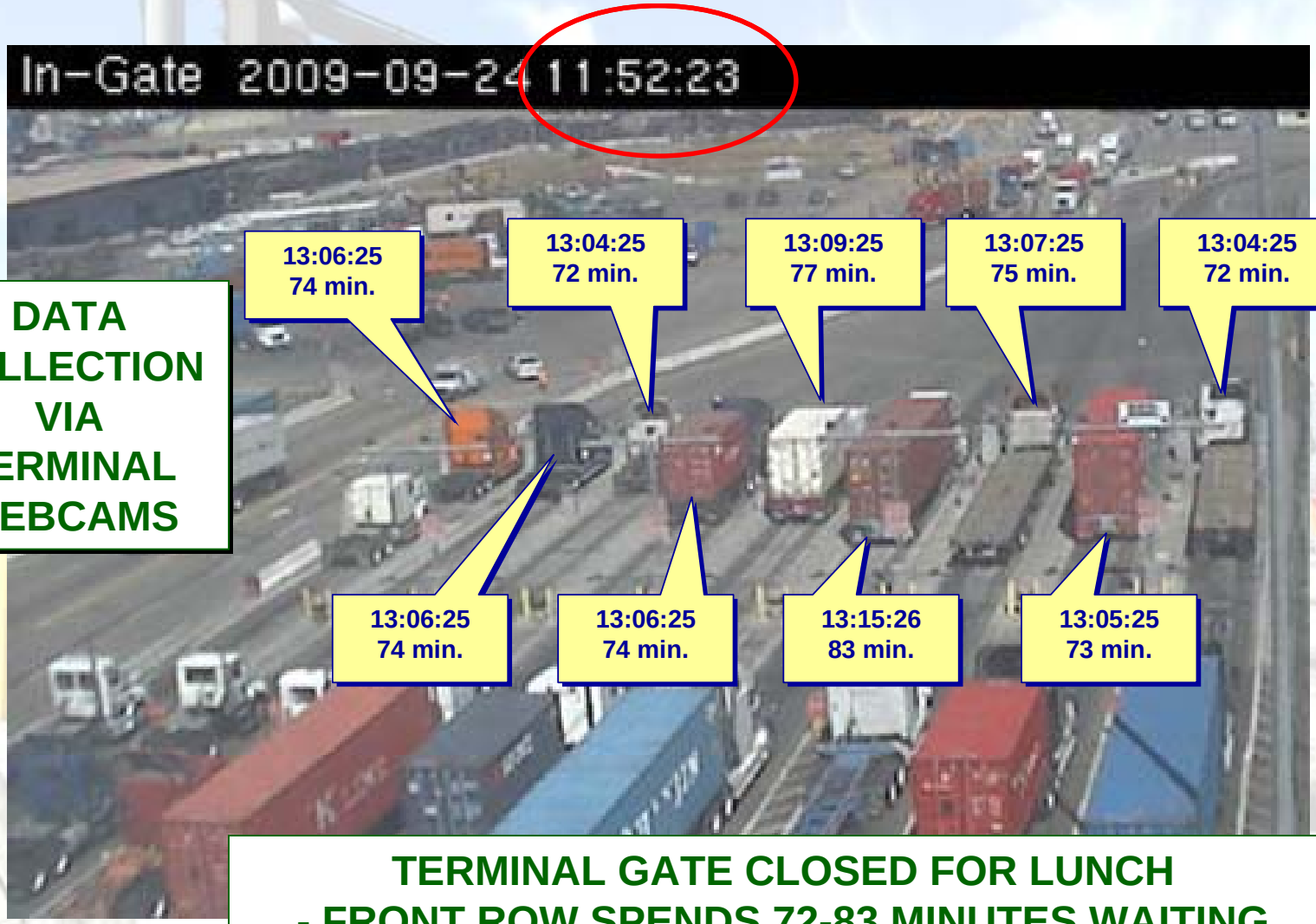

DATA COLLECTION VIA TERMINAL WEBCAMS

TERMINAL GATE CLOSED FOR LUNCH
- FRONT ROW SPENDS 72-83 MINUTES WAITING

Trouble Ticket Causes

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- **5% of transactions get trouble tickets**
- **80% due to booking, dispatch, or system errors**
- **Each one adds an hour**

BOOKING PROBLEMS	**28%**
Booking does not match equipment type	10%
Booking is not on file	7%
Booking tally has already been reached	7%
Missing notice for hazardous cargo	3%
Booking quantity exceeded for equipment type	3%
DISPATCH PROBLEMS	**29%**
Cargo not yet released	8%
Driver or motor carrier credential problem	7%
Empty Container/chassis not allowed	6%
Past cargo cutoff	3%
Demurrage due (unpaid bills)	3%
Container exceeds maximum safe weight	2%
SYSTEM PROBLEMS	**22%**
Container/chassis not recognized	18%
Duplicate transaction	2%
Container not found in yard	2%
Other	20%
TOTAL	**100%**

Chassis Selection & CY Operations

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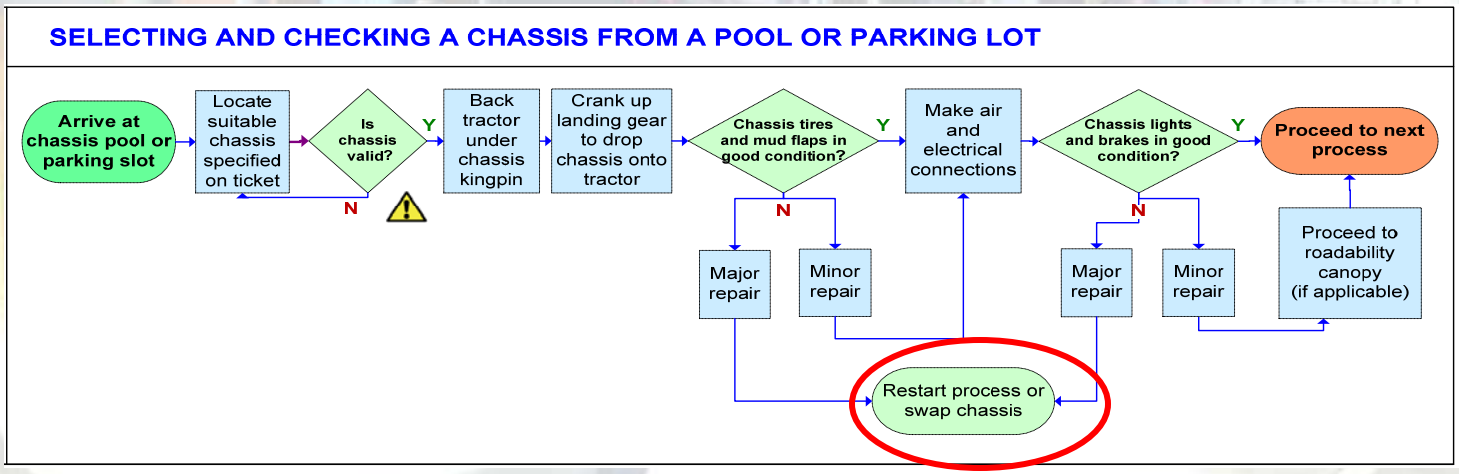
- **Within the terminal, key issues appear to be congestion and chassis selection**
- **Roadability canopies help by speeding minor repairs**
- **Drivers will <u>usually</u> give up on troublesome units after about 30 minutes**
- **Non-identification of defective chassis remains a common problem**



Chassis Selection Times

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- At the same terminal, truckers who had a chassis got out **12 minutes faster** than those who did not.
- Turn times were also more predictable (lower Std Deviation) when truckers brought the chassis.
- **In the near term,** neutral pools expedite chassis searches and reduce equipment problems
- **In the long run**, trucker or third-party chassis supply should reduce terminal time and exceptions

Aggregated Turn Time Summary - Less Outliers (minutes)							
Storage Type	**Count**	**Share**	**Max**	**Min**	**Average**	**Std Dev**	**Margin over Grounded-Own**
Grounded - Own	18,317	49%	436	10	44.3	28.8	na
Grounded	14,770	40%	487	10	56.2	33.2	12.0
Wheeled	1,969	5%	376	12	62.3	43.0	18.0
Flips	2,038	5%	265	17	56.5	32.8	12.2
Total	**37,094**	**100%**	**487**	**10**	48.1	30.7	39.7

Experience Matters – Terminal Data

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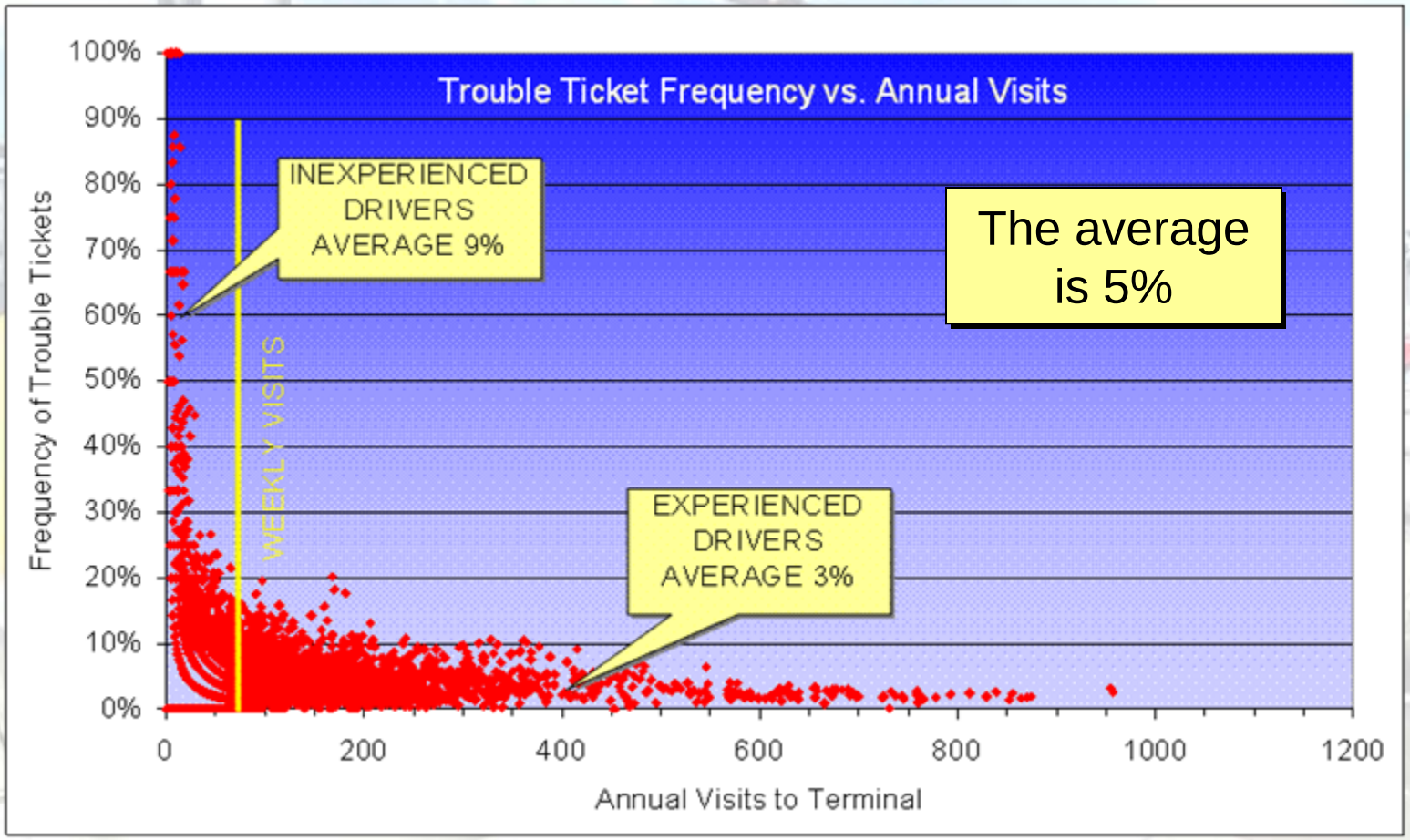
Drivers who visited the port less often received more trouble tickets



The Trucker and Ocean Carrier Matter

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Different organizations produce different results

Trucking Company	Total trips	Transactions per trip	% Trouble Tickets
A	1124	1.2	**2.2%**
B	2649	**1.7**	2.5%
C	1210	1.3	3.7%
D	1146	1.4	3.9%
E	2878	1.2	4.4%
F	1329	1.4	5.6%
G	1193	1.5	**8.5%**

The average is 5%

Transaction Type	Line	Transactions	Trouble Flag	% Trouble Tickets
Deliver Import	**A**	3,438	172	5.0%
	B	4,049	169	4.2%
Deliver Empty	**A**	3,869	307	7.9%
	B	10,106	485	4.8%
Receive Export	**A**	3,391	242	7.1%
	B	9,721	414	4.3%
Receive Empty	**A**	4,197	108	2.6%
	B	3,482	26	0.7%
Total	**A**	14,895	829	**5.6%**
	B	27,358	1,094	**4.0%**

Empty Returns - A New Problem

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Container industry developments have complicated empty container returns

- Space-constrained terminals have pushed out empty and chassis storage functions
- VSAs and alliances have fragmented ocean carrier operations among multiple terminals
- Carriers and terminals are using port information and emails to continually fine-tune empty return instructions

"Split returns" and rework are becoming increasingly common

- Drivers must return empty containers to one facility and chassis to another
- Frequent changes with little advance notice are causing rework and delays

Empty Returns – Split Returns

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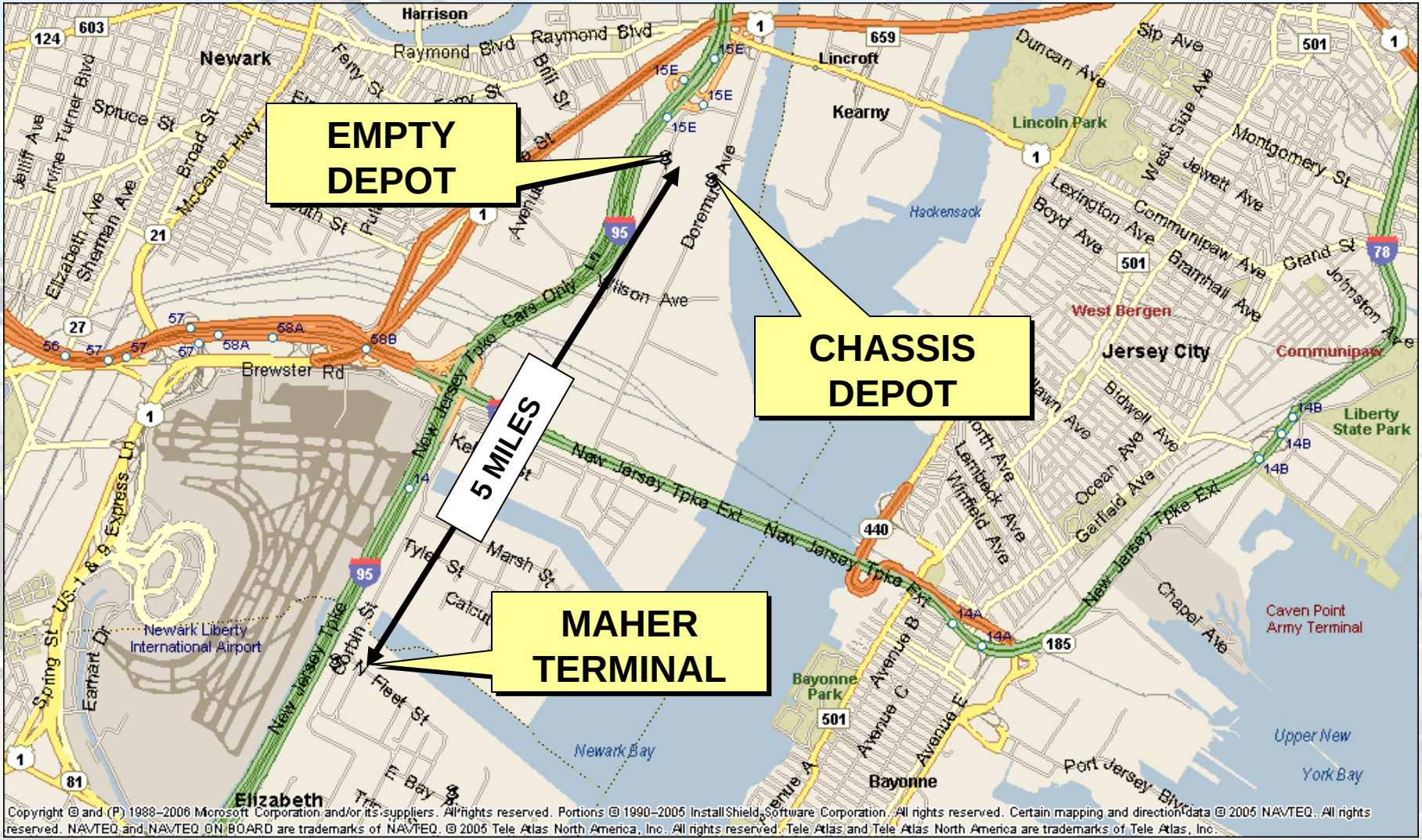

Fragmentation – VIT Empty Return Matrix

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ShiplineCode	ShiplineName	20ft Standard Dry Box	40ft Standard Dry Box	40ft High Cube Dry Box	45ft	Reefer	Any other size or type
AI	Alianca	PMT	NCY/PPCY	PMT/PPCY	PMT	PMT	PMT
AP	American President Line	NIT	NCY/PPCY	NIT	NIT	NIT/PMT	NIT
AL	Atlantic Container Line	PPCY	PPCY	PMT	PMT	PMT	PMT
AN	Australian Natl Line	PPCY	PPCY	PPCY	NIT	PMT	PMT
CV	Chilean Line (Csav)	PMT	PPCY	PPCY	PMT	PMT	PMT
CS	China Shipping Container Line	PMT	PMT	PMT	PMT	PMT	PMT
CA	Cma-Cgm (America) Inc	PPCY	PPCY	PPCY	NIT	PMT	PMT
PA	Compania Libra De Navegacion	PMT	PPCY	PPCY	PMT	PMT	PMT
CH	Cosco (China Ocean Shipping)	NCY	NCY	NCY	NIT	NIT	NIT
EV	Evergreen Marine	PPCY	PPCY	PPCY	INELIGIBLE	PMT	PMT
CO	Hamburg Sud Na	PMT	NCY/PPCY	PMT/PPCY	PMT	PMT	PMT
HJ	Hanjin Shipping Line	NCY/PPCY	NCY/PPCY	NCY/PPCY	NIT	INELIGIBLE	NIT
HP	Hapag Lloyd Container Line	NCY/PPCY	NCY/PPCY	NIT	NIT	NIT	NIT
HY	Hyundai America Shipping Agcy	NIT	NCY	NIT	NIT	NIT	INELIGIBLE
KL	K-Line	NIT	NCY	NIT/NCY	NIT	NIT	NIT
MA	Macandrews	PPCY	PPCY	PPCY	NIT	PMT	PMT
MS	Maersk Line Agency	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE
MD	Mediterranean Shipping	NIT	NCY/PPCY	PPCY	INELIGIBLE	PMT	PMT
MI	Mitsui Osk Lines	NIT	NIT	NIT	NIT	NIT	
NY	N.Y.K. Lines	PPCY	PPCY	PPCY	NIT	NIT	NIT
NS	Natl Ship Co Of Saudi Arabia	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE
OS	Oocl Usa	NCY	NIT/PPCY	NCY/PPCY	NIT	INELIGIBLE	NIT
SA	Safmarine	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE	INELIGIBLE
SC	Shipping Corp Of India	PMT	PMT	PMT	PMT	PMT	PMT
TR	Turkon Line	PPCY	PMT	PMT	PMT	PMT	PMT
UA	United Arab Line	NCY	NCY/PPCY	NCY	NIT	NIT	NIT
MY	Yang Ming	NCY	NCY/PPCY	NIT/PPCY	NIT	NIT	NIT
MZ	Zim American Israeli Shipping	NIT	PPCY	NIT	NIT	NIT	NIT

Empty Returns – Frequent Changes

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Tue 6/22/2010 9:14 AM: "Please note that all CMA & ANL-USLINES export equipment releases today are from Pier A. Please e-mail the CMA Equipment Group for EDO releases for all export bookings made from any other terminals to: mailto: logistics-west-equipment@cma-cgm.com **All 20ST import, empty containers return to APM. All 40ST, 40HC, and 45HC containers return to Pier A today. All WCCP pool chassis' must return to Pier A in Long Beach. All Maersk chassis must return to APM Terminal in LA.** Please utilize this link to determine the empty return location for CMA equipment. http://apps.usa.cma-cgm.com/econtainer/"

Wed 6/23/2010 11:04 AM: "LONG BEACH MSC EMPTY TERMINATION Effective :Thursday June 24 1st & 2nd shift Friday June 25 , 1st shift. SSA pier A will close gates during above shifts for mty termination only. **All MSC empties pulled from Pier A, Ramps & Shippers transport, have to terminate at SSA Pier J** (Pacific container terminal) NOTE EXCEPTION: All special equipment RETURNS TO PIER A (Flat Racks, Open Tops, and Reefers). Operations will resume on Monday June 28 for the 1st shift."

Fri 6/25/2010 3:14 PM: "Effective Immediately, 6/25/10 **All Import Empty Returns out of SSA Terminals (PCT / Pier A) for MSC, must be Delivered to Pier A and NOT Pier J**"

Verbatim Emails

Reducing Bottlenecks

- Keep gates open during lunch
- Chassis pool – Saves time in stacked terminals
- Trucker chassis supply (long term)
- Two-stage gates (or Eqv.) – Gets exceptions out of line
- Appointment system – May save time, depends on implementation
- Rationalize empty returns

Reducing Exceptions – The 5% "tail"

- **Talk** – regular trucker/terminal/port/customer meetings
- Manage booking, dispatch, and system communications
- Choose experienced trucker and efficient ocean carrier

Contacts and Follow-ups

National Cooperative Freight Research Program Project 14:
http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2412

Tioga website: www.tiogagroup.com

Project manager: dsmith@tiogagroup.com, 925-631-0742