

Enhancing Capacity of Domestic Small Container Terminal through Yard Re-layout

(Case Study Palaran Terminal)

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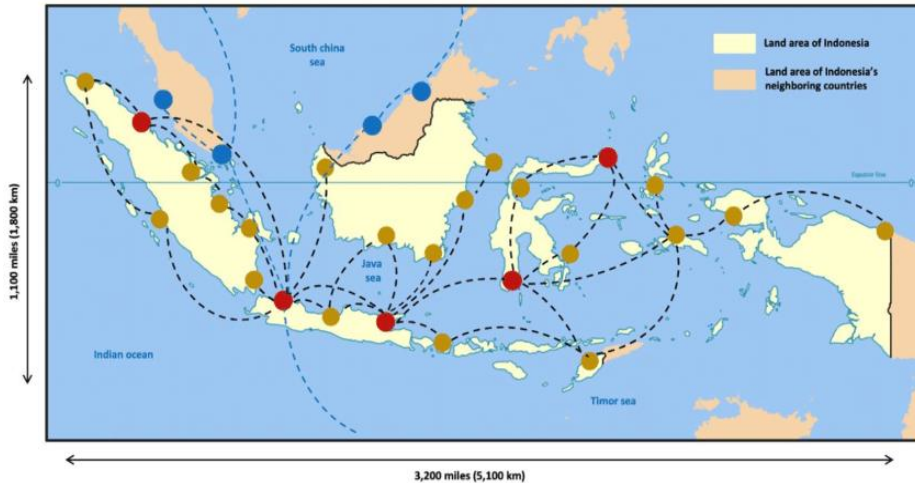
Introduction

Background

- 100% of inbound traffic from Java; Kalimantan ports primarily function as consumer ports
- Economic growth in Kalimantan has led to increased demand for container traffic, risking congestion.
- Small ports outside Java face unique challenges due to limited land and high expansion costs.

Objective

- Explore low-cost, innovative strategies for optimizing terminal capacity through yard re-layout.



CONGESTION (2014-2015)



Problem Statement

Challenges

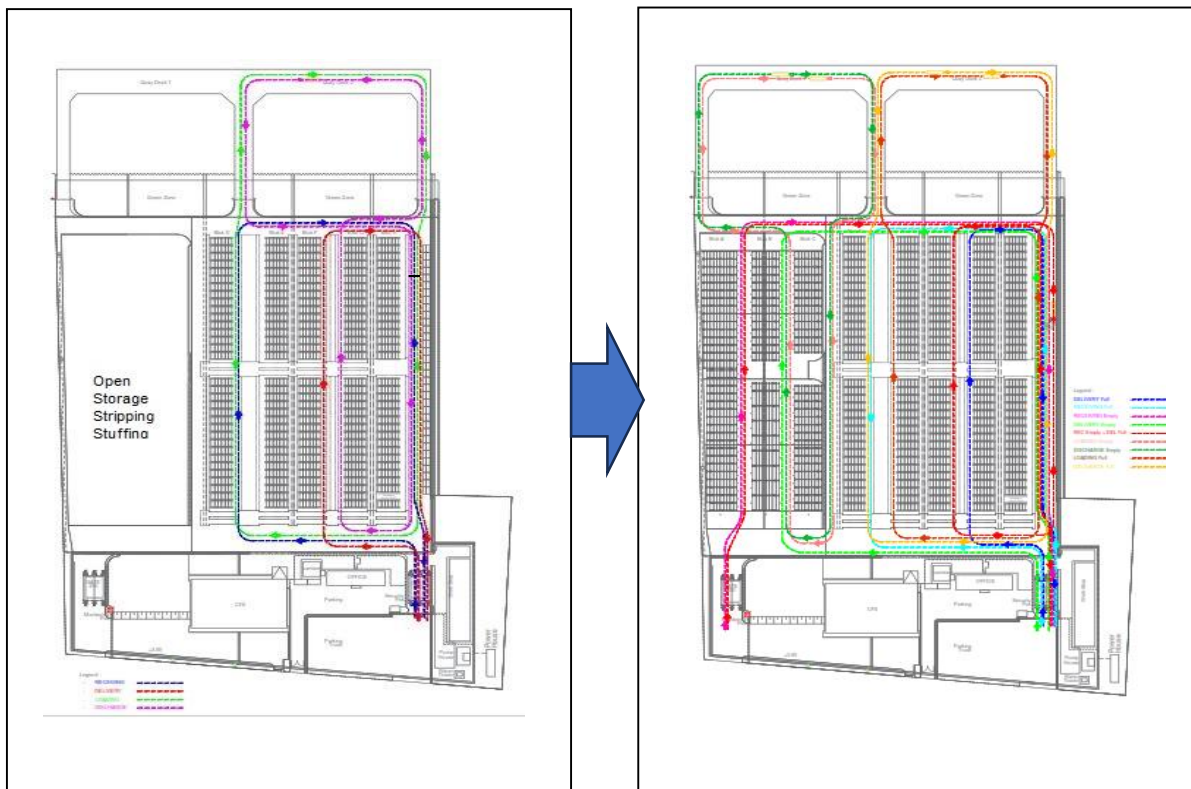
- Limited capacity and space at small terminals restrict expansion.
- Mixing full and empty containers in the yard leads to inefficiencies.
- Need for cost-effective methods to increase terminal capacity and productivity.

Methodology

Approach

- Comparative analysis of yard layouts (mixed and separated).
- Relocate stripping and stuffing activities offsite and repurpose the area for empty containers.
- Use specialized equipment (double-box empty side loaders) to enhance yard efficiency.
- Evaluate impact on Quay Container Crane (QCC) productivity.

Yard Re-layout Overview



Strategy

- Convert 2.6 hectares of open yard from stripping and stuffing to an empty container yard.
- Segregate full and empty containers to improve operational flow.

Convert 2.6 hectares of open yard from stripping and stuffing to an empty container yard



Yard Re-layout Overview

EMPTY YARD



EMPTY HAULAGE



EMPTY LOADING



Strategy

- Employ side loaders and twin lift equipment for handling empty containers.

Results

Existing Yard (Land area 5,1 Ha)						Additional Relayout (Land area 2,7 Ha)						
Blok	Slot	Row	Ground Slot	Tiers	Capacity (TEU's)	Blok	Slot	Row	Ground Slot	Tiers	Capacity (TEU's)	Total Capacity
D	33	6,0	198	5	990	A	33	9,4	311	8	2.488	4,950
E	33	6,0	198	5	990	B	31	8,0	248	8	1.984	6,328
F	33	6,0	198	5	990	C	29	8,0	232	8	1.856	
G	33	6,0	198	5	990							
H	33	6,0	198	5	990							
			990		4,950				791		6.328	11.278

Capacity Increase

- Capacity increased from 4,950 to 11,278 ground slots.
- Reduced Yard Occupation Rate (YOR) to 50%, mitigating congestion.
- Enhanced flow from yard to wharf, optimizing Quay Crane productivity.

Results

Year	Call	Load/Unload (Teus)	Volume Design	Yard Capacity	BCH (Gross)	BCH (Nett)	Opr Time	Port Stay	BOR	YOR
2015	577	232.581	220.000	216.810	15,9	20,6	13,3	17,7	63%	107%
2016	542	226.965	220.000	574.163	23,8	30,5	12,4	15,6	48%	40%
2017	491	238.819	220.000	459.331	24,6	31,2	14,0	17,2	48%	50%

Productivity Improvement

- 30% increase in Box Crane Hours (BCH) from 2015 to 2017.
- Berth Occupancy Rate (BOR) reduced from 63% to 48%.
- Potential for further capacity expansion as BOR approaches 60%.

Discussion

Key Insights

- Yard re-layout is a cost-effective solution for capacity enhancement without major investments.
- Specialized equipment and dedicated empty container yards improve efficiency.
- This approach positions terminals for future growth while remaining competitive.

Conclusion

Summary

- Re-layout strategies effectively enhance terminal capacity without significant capital outlay.
- Using competitive, more efficient equipment for empties, like double-box side loader, combo trailer, twin lift spreader, improves yard operations.
- Reconfiguring Container Yard Layout by separating Empty and Full into dedicated area not only minimizes operational inefficiencies, also significantly boost terminal productivity
- The terminal more competitive.

Future Research

Year	Volune	BCH	BOR
2015	232581	21	63%
2016	226965	30	48%
2017	238819	31	48%
2022	289631	37	55%
2023	332800	42	59%

- Explore the implementation of double cycling to further improve QCC productivity.

THANK YOU