



Power up your TOS:

Achieving greater return on investment through agile optimization

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The Future of Containerization:

Technology innovations that improve process, performance efficiency, safety and productivity

There are known knowns. These are things we know that we know.

There are known unknowns. That is to say, there are things that we know we don't know.

But there are also unknown unknowns. There are things we don't know we don't know.

Society

The known and the unknown unknowns

- Will algorithms erode our decision-making skills?
- Where will automation take us?
- Can happiness be automated?



Technology

The known and the unknown unknowns

- Disruptive technologies:
Over-hyped and Uber-styled?
- Automation: Is there a right time to take the hands off the wheel?
- Autonomous vehicles:
From fenced off to shared spaces?
- Standardization: Is Tesla's open IP approach a model for the port industry?
- Decision-Making:
How fast can man and machine go?

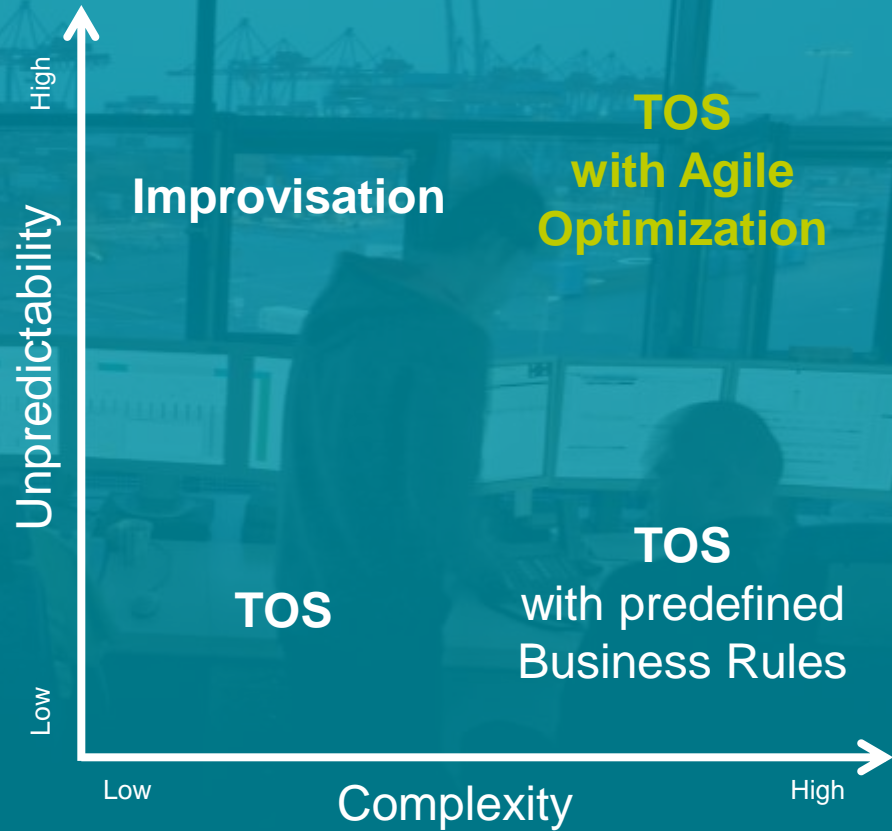


Port Industry

The known and the unknown unknowns

- Mega bets: Win big or lose more?
- Looking the wrong direction? The hinterland connectedness
- Being a Hub or a Spoke?
- Training and automation or automation instead of training?
- Which competencies does an organization need to handle automation?
- What time lines for roll outs do we expect/accept? 6 months, 6 years?

Decision Making in terminal operations



ADVANCES IN TECHNOLOGY

2k
Computer

1.4m
Algorithms

2.8bn
Combined

1990
100
years



Today
1
second

Time to solve a planning model
using Linear Programming

Agile Optimization across the terminal

- 01 Yard Optimizer
- 02 Vehicle Optimizer
- 03 Crane Optimizer
- 04 Truck Scheduler
- 05 Train Load Optimizer
- 06 Train Scheduler
- 07 Quay Crane Supply Optimizer

Agile Optimization

Modest means, big results, high flexibility

39% ↓
fleet size

51% ↓
rehandles

21% ↑
yard crane
productivity

20% ↓
rail cranes

35% ↑
yard
utilization

↓
truck gate-in/
gate-out
time

17% ↑
railcar slot
availability

Launching Agile Optimization

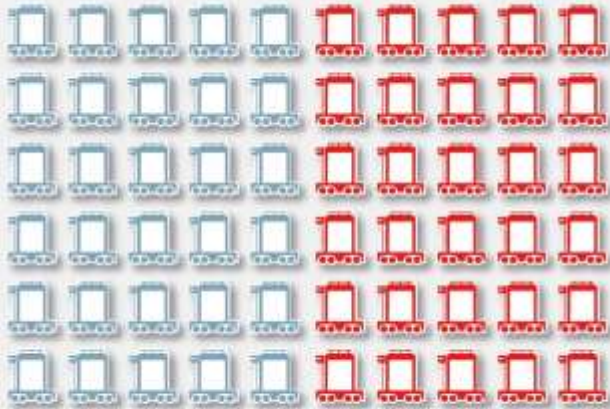
When is the best time?



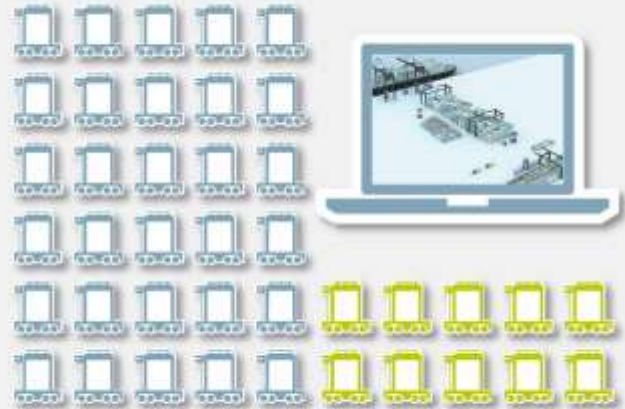
Shrink to Grow

Equipment Replacement Projects

Before Optimization - from a fleet of 60 straddle carriers, 30 ageing straddle carriers need to be replaced.



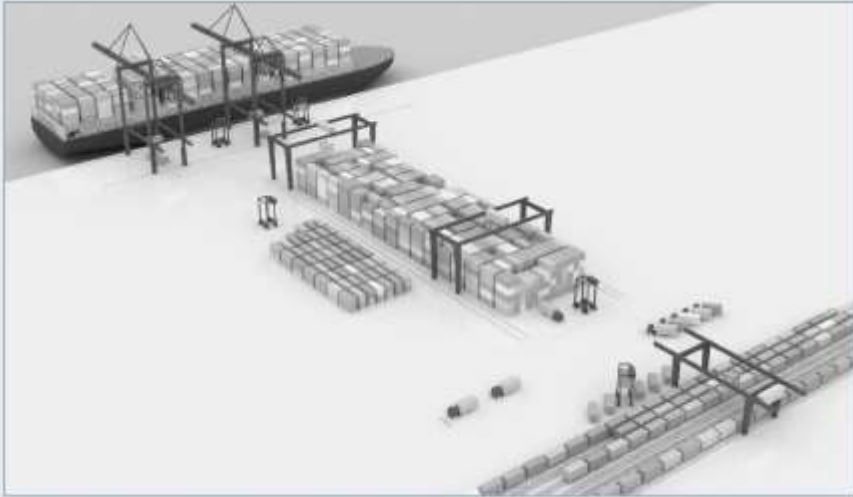
After Optimization - only 40 straddle carriers are needed reducing the total number to be replaced to 10 resulting in large cost savings.



Expand in Efficiency

Brownfield Projects

Before Optimization - a brownfield terminal is operating nearly at its designed capacity and needs to expand to allow for future growth.



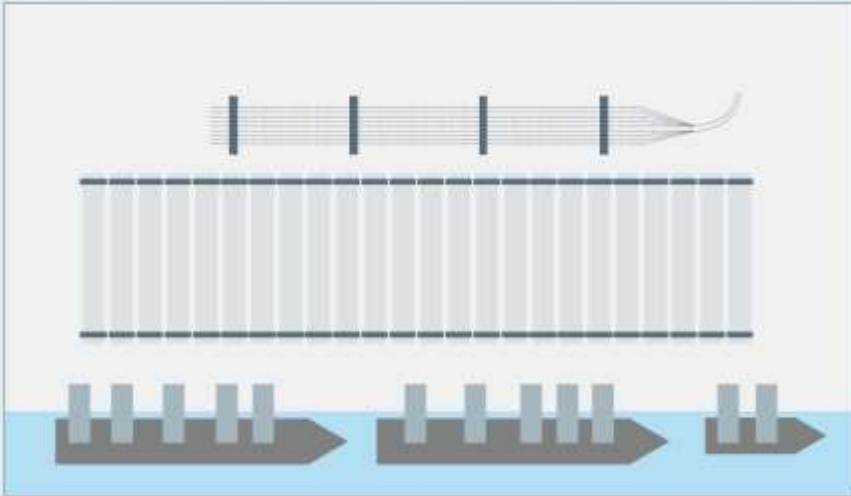
After Optimization - decreasing rehandles and improving RMG productivity increases terminal's capacity without new infrastructure.



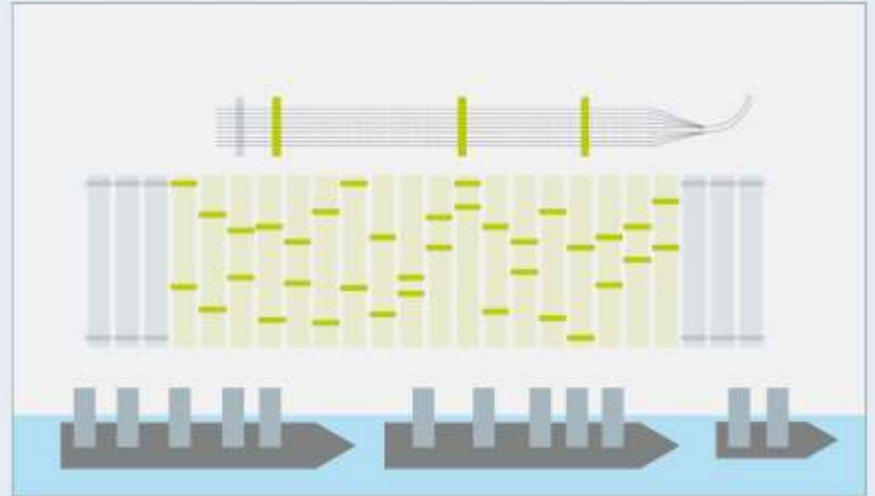
Reduce to the Max

Greenfield Projects

Before Optimization - a greenfield terminal is designed with 4 rail cranes and 24 yard blocks to service the projected TEU throughput.



After Optimization - the terminal is able to reduce the required rail cranes to 3 and yard blocks to 18 significantly reducing costs.



Case Study

Agile Optimization

The HHLA logo is displayed within a white rectangular box. It features the letters 'HHLA' in a white, bold, sans-serif font on a dark blue rectangular background. To the right of the blue background are two vertical bars, one red and one white.

HHLA

CTA – Hamburg, Germany

The HHLA logo consists of the letters 'HHLA' in white on a dark blue rectangular background, followed by three vertical bars in red, white, and blue.

HHLA

CTA – Hamburg, Germany



Germany's largest
Container Rail
Terminal: **3m TEU/a.**
0.5m boxes by rail
in 2013 (0.8 TEU).



9 rail tracks of
720m with **4 RMG**
(30 trains/d).
12 tractors, 200
chassis.
2,500 trucks/d (gate).



Optimization of
transport chains
and **empty chassis.**
Terminal truck
optimization.
Rail Crane optimizer.



Hinterland
optimization since
2002.
Expansion to up to
0.93m TEU (within
existing footprint) in
April 2016.

Agile Optimization

Key take-aways

- Extra efficiency without mega changes
- Add-on to existing TOS
- Integration into TOS with virtually no downtime
- Familiar TOS environment: no extra training required
- No additional infrastructure, resources, manpower needed

Today is the slowest
pace of innovation we will
ever experience!