Productivity:

Evolution and Revolution

Singapore Maritime Technology Conference
Singapore – 23rd April, 2015
Agenda

Introduction and Trends

Evolution

Revolution
Your speakers

David Alba
President & CEO
Grid Logistics Inc
California, USA

Andy Lane
Partner
CTI Consultancy
Singapore

– Clean-Tech incubator company
– Design Build Maintain & Operate
– Global Consortium Organizer of GRID Projects

Solutions to tackle
– Minimalisation of footprint
– Maximisation of output
– Enhancing the end-to-end supply chain
– Environment and Safety

– Business advisory
– Business performance optimisation
– Management-for-hire

For:
– Terminals
– Carriers
– Ports
– Logistics providers
– Investors
Productivity Trends

- **Asia** leads the world in productivity, and has made some modest gains
- Elsewhere productivity has **declined**
- Whilst at the same time vessel and call sizes (quantity of moves) have **increased** – dramatically
- 1 step forwards – 2 steps backwards

- For the largest vessels, the top 10 ports (9 in Asia/M.East) have shown **improvements** between 2012 and 2013
- The **gap** is potentially increasing between industry leaders and others

Source for all: JOC global productivity report – 2013 & 2014H1
Ship Size Trends – 7 generations in 40 years

<table>
<thead>
<tr>
<th>Generation</th>
<th>Year</th>
<th>TEU</th>
<th>RT Moves</th>
<th>Ports</th>
<th>Moves/Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>1974</td>
<td>2,400</td>
<td>6,813</td>
<td>9</td>
<td>757</td>
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<tr>
<td>2nd</td>
<td>1981</td>
<td>3,600</td>
<td>10,219</td>
<td>9</td>
<td>1,135</td>
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<tr>
<td>3rd</td>
<td>1988</td>
<td>4,800</td>
<td>13,626</td>
<td>11</td>
<td>1,239</td>
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<tr>
<td>4th</td>
<td>1995</td>
<td>6,600</td>
<td>18,735</td>
<td>11</td>
<td>1,703</td>
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<td>5th</td>
<td>2001</td>
<td>8,700</td>
<td>23,991</td>
<td>11</td>
<td>2,181</td>
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<tr>
<td>6th</td>
<td>2006</td>
<td>15,500</td>
<td>42,625</td>
<td>11</td>
<td>3,875</td>
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<tr>
<td>7th</td>
<td>2013</td>
<td>18,000</td>
<td>49,500</td>
<td>11</td>
<td>4,500</td>
</tr>
<tr>
<td>8th</td>
<td>202?</td>
<td>24,000</td>
<td>66,000</td>
<td>11</td>
<td>6,000</td>
</tr>
</tbody>
</table>

- Larger ships do not call more ports
- = Moves per call increase
- Productivity trends need to at least match this – else we are going backwards
- Leading to...

Source: CTI Analysis
Indicative of Asia-Europe deployment
Load+Discharge+(Restow+Wayport – 10%) x TEU factor (1.6)
100% round-trip utilisation
Schedule Reliability Trends

- ... have been rapidly **deteriorating**
- Larger ships = **larger problems**
- High fuel prices make **speed** increases to catch-up time cost-prohibitive
- Increased port time erodes **sea buffers**

**Source:** SeaIntel – 2014Q4 trend impacted by USWC issues

- **Crane intensity** must keep pace with call-size growth
- Physical limitation on 400 meter long ships – maximum **12 cranes**

**Terminals:**
- Need to work with Lines on **stowage**
- Need to focus on **crane rates**
- **Higher crane density ???**
In order to achieve a worthwhile **slot cost advantage**, the 8th generation would need to have at least **30% more capacity**

Slot cost reductions are **not linear**

We are starting to reach the **plateau**

The **risks** are many:

- Can you fill it?
  - How much **market share** or how many partners are needed? Long term (15 years) demand expectations?
  - An **85%** full 24,000 TEU ship yields the same slot cost as 100% full 18,000 TEU!
- Can it transit **Suez** fully laden?
- Can **ports/terminals** accommodate it?
- Do you need **13** to make a string?
- Can it be deployed with **flexibility**?
- Future **fuels** and costs?
- **Insurance** premiums and loss risks

They might be appropriate for the next decade. We are unlikely to see them within a few years, but they will probably come eventually!
Cascading trends – all trades will be affected

The impact of the mega ships will be experienced on **all trades**

- Intra-regional trades might be getting close to maximum practical size already
- ... constrained by **terminal productivity**

**Average Ship Size per Trade/Region - 2015**

- Asia-N.Eur: 13,500
- Asia-Med: 9,000
- TransPacific: 8,000
- EC-LAM: 7,500
- WC-LAM: 7,000
- Asia-MEA: 7,000

**Average size per trade lane - 2011 to 2015**

- Asia-N.Europe: 27%
- Asia-Med: 36%
- TransPacific: 21%
- Asia-ECSA: 59%
- Asia-WCSA: 47%
- Asia-ME: 47%

**Vessel Cascading**

- Tier 1: Asia-N.Europe
- Tier 2: TransPacific, Asia-Med
- Tier 3: Latin America, Asia-Middle East
- Tier 4: West Africa, TransAtlantic, Oceania

Source: Drewry – November 2014
Agenda

Introduction and Trends

Evolution

Revolution
Battlefield: Productivity

- The opportunities are almost infinite! – For existing terminals

**Mindsets**
- Acknowledgement
- Voice of the Customer
- Productivity as a Competitive Advantage anchored in the strategy
- Top-down relentless and consistent communication
- Ready the organisation to execute the strategy

**Continuous Improvement**
- Create the function
- Education and training
- Standardise metrics
- Benchmarking
- Project priority pipeline
- Gather empirical data
- Attack true root-causes

**Performance Routines**
- Engrained in the company DNA
- Visual Management Systems
- KPI’s and Objectives
- Accountability and responsibility
- Rewards and recognition

**Collaboration & Cooperation**
- Improve communication and planning
- Look for the mutual benefits
- Trust
- Share more information
- Joint process improvement teams

"6,000 Moves in 24 Hours, please"
- Soren Skou
- (CEO Maersk Line) 2012

It does not need to mirror Rocket-Science
And it does not require capital investment
## Congruity or Conflict?

<table>
<thead>
<tr>
<th>Terminals wish</th>
<th>Lines / Alliances wish</th>
</tr>
</thead>
<tbody>
<tr>
<td>- On time arrival</td>
<td>- Berth on arrival</td>
</tr>
<tr>
<td>- Maximise capacity (utilisation)</td>
<td>- Maximise speed</td>
</tr>
<tr>
<td>- Stowage plan quality</td>
<td>- Increased crane intensity</td>
</tr>
<tr>
<td>- Earlier high quality data</td>
<td>- Improved crane efficiency</td>
</tr>
<tr>
<td>- Balance gate flows</td>
<td>- Faster truck turn-time</td>
</tr>
<tr>
<td>- Additional volumes</td>
<td>- Scalability</td>
</tr>
<tr>
<td>- Highest revenue</td>
<td>- Lowest TCO</td>
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</tbody>
</table>

- There are many **opportunities** for deeper collaboration and cooperation
- And that will produce **win-win** results
- Only a **time** investment is required

- **Winning** together...
- or **Losing** apart?
Agenda

Introduction and Trends

Evolution

Revolution
The Revolution

Innovation Is Inevitable

SINGAPORE MARITIME WEEK 2015
The Revolution – Exploiting Technology

- **TECHNOLOGY** HAS CHANGED OUR WORLD

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**CONTENT - INFORMATION (DATA/MEDIA) TRANSFER**

**TECHNOLOGY’S INFRASTRUCTURE PLATFORM**

- PROCESS
- STORAGE
- BANDWIDTH

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**GRID logistics inc**

**CONTAINER TRANSPORT INTERNATIONAL CONSULTANCY**
The Revolution – Infrastructure Analogy

- CONTAINER SHIPPING MEETS SILICON VALLEY

CONTENT – LOADED AND EMPTY CONTAINER TRANSFER

PROCESSORS
- SHIPS, TRAINS, CRANES AND TRUCKS

STORAGE
- CONTAINER YARDS REDUNDANT OPERATIONAL COST CENTERS

BANDWIDTH
- BERTHING QUAY, GATE, RAIL AND ROAD
The Revolution – The Steps

- Increase Container Velocity
- Improve Storage Efficiency
- Increase Container Flow

PROCESS  STORAGE  BANDWIDTH

REDUCE Land & Carbon

FOOTPRINT
The Revolution – Core Processor

- CONTAINER SUPPLY CHAIN CORE PROCESSOR - THE SHIP TO SHORE (STS) CRANE

Design configuration unchanged for over 56 YEARS!

Inherent design limitation affecting performance – CRANE LEGS
The Revolution – Advanced Processors

- First bold effort to reconfiguration of the STS crane

**PROCESSORS**

APMT FASTNET CRANE SYSTEM 2009
The Revolution – Creating Undisputed Competitive Advantages

- **PROCESS – INCREASE CRANE DENSITY (PURE BAY-BY-BAY LOAD ACCESS)**

  **NEW SOLUTION –**
  - MAXIMIZE BERTHING SPACE
  - INTENSIFY CRANE DENSITY (BOOM POPULATION)
  - PURE SHIP TO RAIL INTERFACE AT THE QUAYSIDE

  **OBJECTIVES –**
  - SERVICE VESSELS OF ALL SIZES
  - REDUCED VESSEL DWELL TIME (BY 2/3rds)
  - IMMEDIATE TRANSFER BY RAIL TO FREIGHT TRAINS, SMALLER SHIPS, AND TRUCKS.
The Revolution – Replicate a vessel

STORAGE

OBJECTIVES –
• MAXIMISE STORAGE DENSITY
• AUTOMATED
• ELIMINATE SHIP BOOM DELAYS AND STOPPAGES

NEW SOLUTION –
• DIRECT TO GATE WHERE PRACTICAL – REDUCING STORAGE NEEDS
• STORAGE IN CELL GUIDES
• AUTOMATED STORAGE TO BOOM CONVEYANCE
The Revolution – Minimum footprint

STORAGE

OBJECTIVES –
- MAXIMISE STORAGE DENSITY
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The Revolution – Underground Freight-Pipeline

**Automated • Fully Electric • Underground**

**OBJECTIVES –**
- INLAND FREIGHT STATIONS TO GET CLOSER TO LAST MILE
- TAKING TRUCKS OF STREETS
- ADDRESSING TRUCK CAPACITY SHORTAGES
The Revolution – Underground Freight-Pipeline

- **OBJECTIVES** –
  - INLAND FREIGHT STATIONS TO GET CLOSER TO LAST MILE
  - TAKING TRUCKS OF STREETS
  - ADDRESSING TRUCK CAPACITY SHORTAGES

**Think Beyond the PORT**

Freight Pipeline  
Feeder Terminals
The Revolution – Changing the Game

- Contemporary Transhipment Terminal

2,000 Meters / 24 booms
The Revolution – Changing the Game

- Finger piers supported by a more densely stacked automated yard

1,000 Meters / 30 booms

200 Meters

Total
6,000 Meters
180 Booms
The Revolution – Changing the Game

- Rail system connects the yard to the quay
- Discharged containers go straight to the yard
- Loading containers have been pre-staged on the finger piers
- Loading containers are served to the boom and facilitate maximum dual-cycling
- Any berth connected to any other - automatically

Total
6,000 Meters
180 Booms
The Revolution – Changing the Game

- PORT MODERNIZATION

“The best time to have developed 21st Century port infrastructure was 10 years ago…
...The second best time is now!

GRID Logistics SuperDock™

“Change before you have to”.

- Jack Welsh, Former CEO
General Electric
Thank You!

www.gridinc.biz

www.cticonsultancy.com
The industry has matured

All industries eventually reach an age of maturity, and container logistics is no different. Over 50 years, we have witnessed rapid demand growth and often reasonable profits for most industry players. There were essentially no profit barriers to entry, although the investment capital required has always been high.

As industries mature, they naturally become commoditised, and particularly in the case of container shipping – highly fragmented. Mega alliances assist to further reduce costs without product deteriorisation, they do not however produce industry consolidation from a commercial perspective.

Shippers appear to be somewhat ignorant in both understanding their vendors business drivers and also their own total cost of ownership - which suggests that product differentiation is not necessarily going to secure Customer loyalty or revenue premiums any time soon.

The present supply-demand imbalance will not change in the foreseeable future, and that factor will ensure that shipping revenues remain depressed. There has emerged a handful of lines who are able to make profits in this harsh environment, and they are pulling further ahead through achieving ever lower costs. This will be the prime battlefield moving forwards, with the longevity of those who cannot dramatically reduce costs being of high risk.

Time for change

As businesses evolve - in size, product range, geographical reach, etc – they will increase dramatically in complexity. Interdependencies between processes and functions multiply, resulting in organisations increasingly facing wicked problems. To tackle these requires that traditional business models need to change, and competences need to increase. Organisations need to become faster to change, more agile to shift direction and implement strategies with greater efficiency. New thinking methodologies are required, and the journey of continuous improvement must commence before it is too late – before real crisis strikes.

Sustainably profitable enterprises will create and implement new future-proofed business models on the profit up-slope, and not wait until profits level or even decline – that is merely re-active or crisis management, and often too late.

Opportunities are everywhere

Despite the gloomy outlook – there are many ways and methods through which transportation companies can reduce costs, the tools in box can be increased. CTI would recommend that the industry does not become addicted to the presently low fuel costs – these are highly likely to increase again, so cost reduction efforts must continue to have top priority.

Cost reductions through slow-steaming, re-designed ships and Q&A costs have delivered some savings, but it is still not sufficient. Ordering more large ships will reduce costs, but at the same time will ensure that revenues remain low for longer. Such investments will also have implications on financial gearing ratios.

Lines can and should focus on the following areas of their business to achieve the next levels in the "war on costs":

- Network design & optimisation, including:
  - Empty flow efficiency
  - Optimal fleet
  - Own or buy strategies
- Vendor performance management
- Cost and yield transparency & management
- Process performance and efficiency
- Off-shoring
- Optimise trade mix
- Sales effectiveness
About CTI Consultancy (2/2)

Unmatched functional expertise

CTI is a specialist advisory service, management for hire company. We serve Customers throughout the whole logistics chain, but with a primary focus on what we know best – shipping lines and terminal operators.

CTI has functional expertise in all of the above areas, gained through years of experience within the industry and through driving improvement programs. CTI’s partners are thought-leaders within their realms of expertise – often sharing knowledge through industry media articles and addressing large conference audiences.

The partners are trained and experienced process excellence practitioners.

Examples of completed projects:

- Business process design and training for a top 20 container carrier
- Port productivity project for 2 start-up and semi-automated container terminals
- Road-map for sales effectiveness for a global container carrier
- Yield management within contracting and booking processes for a global container carrier
- Terminal efficiency project and interim management for a large central American container terminal
- Sales transformation project for a top 20 container carrier
- Strategy and turnaround project for a short-sea container carrier

The catalyst for change

At CTI we have made it our mission to be at the very forefront of driving change within in the industry.

In mature organisations, there will always exist an element of cognitive biases (“we’ve always done it this way” or “we tried that and failed”) and subjective framing – where often, proposals are reaching key decision makers without these having been evaluated to determine whether better options might exist. CTI is immune to these idiosyncrasies which can often exist.

CTI’s advisors will apply creative thinking techniques, lateral and parallel, deploying the 6-hats methodology to produce winning strategies.

CTI therefore through its partners and associate advisors brings the outside-in perspectives to any business challenge as well a providing project resources to create additional change capacity.

Our associate advisors are very carefully selected, as they must also possess unique expertise to create maximum value for the client and share the CTI values and business ethics.

The CTI difference

No plan is better than its execution. Driving change in a transportation company is seldom a simple or straightforward exercise. It is prone with risks and traps, and when the plan hits reality, the contemporary consultant is often long-gone.

With CTI you will have a resource which can help you to navigate the entire journey. All CTI advisors have held senior leadership positions with leading industry players - they are the best within their field. They bring the practical hands-on experience, having been owners and drivers of both large and small scale projects during their careers. They can guide the organisation through the perils of change by working on the inside, alongside, and as an integrated member of the team providing real business support to your leaders. The experience and knowledge of the CTI advisors will mean that project traction can be achieved early, as they will not need to learn the business from the grass-roots level and up.

The CTI approach focuses on the People and Process, first, last and everywhere in between. We believe that the success of any project will always require involvement of the people being affected by the change – giving them the opportunity to be an integral part of the solution is often very motivating. This is also required to make the implementation smooth and conducive, and to ensure the greatest chance of sustainable improvement. CTI’s advisors are well versed in stakeholder management and engagement, through being trained as project and functional leaders.

At CTI, our advisors have experienced first hand the frustration of working with consultants, and have felt the void created once the consultants have left. CTI will stay with you through the execution and implementation, provide high quality aftercare and transfer our knowledge to your teams for greater sustainability and self-sufficiency.
Excerpts from GLI Business Plan

Founded in 2011 by David J. Alba and Richard I. Mueller, GRID Logistics, Inc. (GLI) is a start-up container shipping logistics company proposing innovative freight transportation infrastructure. GLI is pioneering a transformation of the 50-year-old conventional container movement industry by engineering a seamless integration of ship-train-truck container movement between port complexes and inland destinations. This state-of-the-art design is a practical, scalable, cost-efficient, and exportable container management system capable of generating long-term operational revenue. Our primary service comprises loading and discharge of all ships, including next-generation ultra-large container vessels (ULCVs), Class 1 trains, and our proposed underground electrified drone train circuit with new crane and intermodal container terminal designs. The GRID systems will improve:

- **Ship loading and unloading; reducing all vessel dwell times by up to 70%**
- **Train processing; reducing Class 1 train discharge and load-back time by up to 90% (in California model)**
- **Environmental impact; reducing pollution caused by the goods movement system**
- **Reducing road damages and traffic congestion caused by truck drayage by implementing a sub-surface right-of-way for regional container transport using an electric drone train system.**

These efficiency improvements will encourage shippers and railroads to use the GRID infrastructure in order to maintain competitiveness.

This system has been endorsed by the Sierra Club and numerous labor unions representing tens of thousands of workers in Southern California.

Mission Statement

**GLI will streamline the transportation of containerized cargo throughout the supply chain.**

Performance and Societal Advantages

The SuperDock™ and the subsequent distribution of containers through the freight pipeline will provide the following advantages to port regions and surrounding communities.

1) Turn-around time for freight trains delivering containers to areas outside regional boundaries will be significantly reduced.
2) Due to the unloading speed of the SuperDock™, all container ships, including the new “post Panamax” ships, will be more profitable berthing at the SuperDock™.
3) Substantially lower emissions will result from using only electric power for the SuperDock™ and freight pipeline.
4) Significant reductions in port-related container truck traffic on local highways will result in lower diesel emissions, lowered congestion, improved commuter safety, and reduced need for highway maintenance, repair, and expansion.
5) 100% of containers can be x-ray inspected as each is lifted from the ship to the SuperDock™, enhancing national security.
6) The entire infrastructure will be built without interfering with current transportation modes.
7) Expensive near-dock container transfer facilities are not required, since the SuperDock™ would load and unload trains, including unit trains, more efficiently, right at the waterside.
8) At targeted ports, thousands of acres of land currently used for container storage will be freed for higher-value port real-estate development.
9) The SuperDock™ and freight pipeline will pay for themselves with money already spent in the current system’s inefficiencies, so no new public debt will be incurred and no new increase in transportation costs will be added to the cost of shipped goods.
Total capacity of a fully built SuperDock™ system is estimated to approach 50M TEU, which can be built incrementally as volumes increase without impacting commissioned service.

Freight Pipelines can be expanded to provide underground delivery of goods to future transit-oriented developments, reducing the need for additional highways to be built in already congested urban areas.

Strategy

The GRID Project will require a range of stakeholders representing various different industries involved in the transportation of containerized cargo. Among the various regional stakeholder interests, GLI expects to be involved with the host-city of any proposed Inland Feeder Terminal or site along the Freight Pipeline. The following represents rationale for expected support from stakeholder interests:

Shipping lines

Shipping lines will benefit from GRID by being able to expand upon the measures they have implemented to increase economies of scale and to load/unload container ships rapidly and efficiently.

By significantly reducing the time spent in ports, GLI systems will increase the utilization of shipping line assets.

Ports

Building a SuperDock™ and freight pipeline feeder system will allow ports to decrease their footprint, both physically and environmentally. This will yield acreage for redevelopment, increase productivity, reduce berth times for vessels, trains, and trucks, and increase operational revenue.

Railroads

GLI systems and technologies will reduce the turn times for Class 1 trains and thus improve the efficiencies of their operations and logistics. By allowing the premier Class 1 railroads in port complexes to bypass near-dock container transfer facilities, the GRID system eliminates significant operational costs in re-handling containers near the port for building trains to various destinations in the interior. Rather, trains will be assembled at dockside and sent directly to major rail yards across the country and continent.

Government

GLI will work with relevant government officials at local, regional, and national levels to ensure that all associated parties are satisfied with the design-finance-build-maintain-and operate proposal in terms of legality, social and environmental responsibility, and economic prosperity.

GRID Projects are Public Private Partnerships P3s

A P3 model is a contract involving a government agency and a private sector company to build projects that affect the region in which it is proposed. P3 models are increasingly being used to develop costly projects that governments realize will benefit their regions but for which there is insufficient taxpayer funding available. The government entity will provide necessary contributions to a project in order to attract further private engagement and investment.

In the case of GLI, a P3 model will be highly beneficial in implementing the system. The Project requires land easements from governmental agencies that own the land on which the SuperDock™ is proposed to be built, as well as the rights-of-way for a freight pipeline, if applicable. Land for potential Inland Feeder Terminal sites will need to purchased or permitted for use, likely from local governments or private entities. Condemnation rights or assistance may be required.

Government provision of these land easements will allow GLI to form a private consortium of companies to complete the Design-Build phases of the GRID Project without the use of taxpayer funds. Government support could contribute to establishing technical trade schools to educate the next generation of construction and logistics professionals.