Success Through A Highly Integrated Supply Chain: Toyota North America

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Professor, Georgia Southern University

Mr. Matt Greene
Assistant Manager – Purchasing, TEMA

Mr. Steve Hagan
Assistant Manager – PCL, TEMA

Mr. Kevin Thornberry
Assistant Manager, PCL, TEMA
Here Are Your Speakers!

Dr. Karl Manrodt

• Current Roles at Georgia Southern University:
  – Associate Professor, Department of Management, Marketing and Logistics
  – Co-Director, Southern Center for Logistics & Intermodal Transportation

• Published:
  – Customer Responsive Management: The Flexible Advantage, 1992
  – Keeping Score: Measuring the Business Value of Logistics in the Supply Chain, 1999

• Degrees Include:
  – B.A. in Philosophy and Psychology, Wartburg College
  – M.S. in Logistics, Wright State University
  – Ph.D., University of Tennessee
Here Are Your Speakers!

Mr. Matt Greene

• Assistant Manager of PCL, TEMA
  – Responsibilities:
    • Manage procurement of North American Returnable Packaging & Logistics Services
    • Develop & manage strategies for commercial, process & operational kaizen for packaging & logistics
  
  – Education:
    • Harvard University, BA Mechanical Engineering - 1994
Here Are Your Speakers!

Mr. Steve Hagan

• Assistant Manager of PCL, TEMA
  – Responsibilities:
    • Overall mgmt of Midwest Logistics Network Ops
    • Lead process kaizen and problem solving
    • Cost Management
    • Established new Mexico Plant’s supply chain (04)
  – Education:
    • The Ohio State University, BSBA - 1999
Here Are Your Speakers!

Mr. Kevin Thornberry

• Assistant Manager, TEMA Logistics Planning – Supply Chain Design
  – Responsibilities include:
    • Lead supply chain kaizen with focus on reducing costs, lead time and removing unnecessary complexities
    • Lead development of logistics support systems
    • North American Logistics Workshop Lead
  – Education:
    • Xavier University, MBA - 1999
    • Eastern Kentucky University, BBA Finance - 1994
This Session Will...

- Define supply chain integration and why it is an enabler to Toyota’s success
- Discuss the information and material flows within the Toyota supply chain
- Share how integration and collaboration can lead to cost reduction and service improvements
- Reveal how managing through Key Performance Indicators (KPIs) is effective and efficient
This Session Will Not...

- Define or discuss basic lean terms, principles, or philosophies
- Be entirely presentation based
North American Capacity

Capacity: Nearly 2 Million in 2008

- SIA
- Texas
- Mexico
- Canada
- Indiana
- NUMMI
- Kentucky

Million Vehicles


CSCMP 2006
san antonio - october 15-18
supply chain’s premier event
Toyota’s Supply Chain Overview

- ~$600M Parts Logistics Budget N. America.
- ~750+ Suppliers in US, Canada and Mx.
- ~2000+ Route Runs, ~ 835,000 miles per day
- 11 Toyota Plant Customers in Network
- 5 Core Trucking Logistics Partners
- 2 Core Consolidation (Cross Dock) Logistics Partners
- TEMA = Centralized Design for plants
Toyota’s North American Operations
Toyota’s Logistics Network

Increasing Volume
(Supplier Localization + More Plants + production)

Logistics Volume (km³)

- Europe
- North America

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Plant/Warehouse Supplier

LTL

Problems:
• High in-house inventories
  – Much double handling
  – Stores required
• Low Frequency delivery & uneven flow
• High mileage routes
• Complex plant unload required

Traditional Manufacturing Logistics

Supplier

Supplier

Supplier

Milk Run

Plant/ Warehouse

LTL

Supplier
Continuous Flow - No “warehouse” time:
**Strong Logistics Partners + Relationships Required**
Not TPS Logistics

Logistics Not Connected To Production
Supply chain team members can quickly & easily see problems as they occur.....

And make countermeasures immediately.

"Lower the water to see the rocks".
The Need to Integrate

*Integration is:* Combining and coordinating separate parts or elements into a unified whole

*Value:*

- Mileage reduction
- Small lot & high frequency delivery
  - Minimize internal stores inventories
  - Quicker reaction to abnormal
  - Even, spaced out pickups at parts suppliers (smooth production)
- Create environment for dedicated dock delivery (simple)
  - No multi-stop plant unloads
Integrated Manufacturing Logistics
Collaboration is: To work together in a joint intellectual effort

- Ryder
- Transfreight

- Toyota Tusho America (TTA)
- Transfreight

- Ryder
- Schneider
- Transfreight
- VASCOR
- Local Companies
How Is The Relationship Built?

- Complete understanding of both Toyota’s business needs & LP’s capabilities
- Commitment by both parties to achieve excellence
  - Shared values
  - Continued learning
- Shared ownership of processes - development & execution
- Joint problem solving and kaizen to improve overall condition
- Effective & open communication
- Reward & recognition
Different from Other Auto OEMs

- Toyota invests in a handful of providers only
  - LP grows with Toyota
- Others mostly for short term result (e.g. lowest cost)
- Others may not invest in LP learning
  - Culture
  - Train the trainer
  - Global Production Center
- Toyota allows LP to own & manage processes
- Others use directive not collaborative communication
  - No joint problem solving or shared working groups
Building the Relationship: Communication

- Annual Pricing Review (APR)
- Annual Purchasing Policy (APP)
- Benchmarking
- Commercial Working Group
- Daily Problem Reporting
- “Go & See” Initiatives
- Incident Reporting
- Logistics Kaizen Workshop
- Value Analysis (VA) Program

Working Towards Self-Reliance!
Annual Pricing Review (APR)

• Reestablish pricing for each existing business unit
  – LP’s are given cost reduction targets
  – LP’s provide unit cost detail with explanation of all variances above target levels
  – Excessive price changes and wide variances between LP’s can lead to DOB (division of business) changes

• Toyota supports LP’s when challenges to meet cost reduction targets are present
  – Review of LP business model
  – Foster dialogue amongst LP’s to generate cost savings ideas
  – LP’s are provided unit pricing information to benchmark
Annual Pricing Review (APR) Model

Cost Reduction - Pricing Model

Focus on cost reduction by looking at each cost element, not margin
CASE STUDY

• LOGISTICS KAIZEN WORKSHOP
  – JOINT COLLABORATIVE EFFORT AT WORK
Logistics Kaizen Workshop

• TEMA, NAMC, LP joint kaizen activity focusing on logistics opportunities
  1. Supply chain development – *routing efficiency, flexibility*
  2. Packaging – *design, reuse, standardization*
  3. Operations – *productivity, quality of service*

• Purpose: Provide a forum for problem areas (themes) to be addressed
  – Cost Reduction
  – New Model Management
  – Team member development

• Create team environment, share workload & knowledge and create ownership amongst all participants
Example #1 – Trailer Efficiency

Cost = Mile X \textbf{M3} X Rate

\textbf{M3} = trailer efficiency X skid efficiency X box efficiency

1. Trailer
   - Optimize Routing
   - Improve Stackability

2. Skid
   - Optimize Order Frequency
   - Optimize Palletization
   - Maximize QPC
   - Minimize Box Size
   - Optimize Part Orientation

3. Box
**Example #2 - Common Rack**

- **Focus:** Reduce Packaging Investment Cost
- **Method:** Study/Design Common rack with one team
- **Team:** TMMAL, TMMTX, TMMI, NUMMI, TMMBC, TEMA

### Key Points:

1. Focused Team Activity to reduce cost
2. Developed OP for future common pkg Development

### Results:

Reduce Investment Cost by $1.2M; increase flexibility with common design; increase opportunity for re-use

<table>
<thead>
<tr>
<th>Old: 4 Unique Racks</th>
<th>New: 1 Common Rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMMI RACK</td>
<td>TMMTX RACK</td>
</tr>
<tr>
<td>NUMMI RACK</td>
<td>TMMBC RACK</td>
</tr>
</tbody>
</table>
Example #3 – Operations Efficiency

Cost = Mile X M3 X Rate

GCD – TMMK M/R Process Kaizen
–Before Significant wait time

<table>
<thead>
<tr>
<th></th>
<th>N1 1</th>
<th>N1 2</th>
<th>N1 3</th>
<th>N1 4</th>
<th>N1 5</th>
<th>N1 6</th>
<th>N1 7</th>
<th>N1 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM 1:</td>
<td>Move Freight from the M/L Lay Down Area</td>
<td></td>
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<td></td>
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<tr>
<td>TM 3:</td>
<td>Move Freight to Set Lane</td>
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</tr>
</tbody>
</table>

AFTER ALL FREIGHT HAS BEEN CLEARED:

TM 1: Load Truck #1

TM 3: Load Truck #2

WAIT for Next Cycle

 TM 2:
1) Pull Tickets & Slot in Ticket Box.  
2) Clear Freight against TMMK Checsheet

Time = 0 to 40 (min)

Time = 41 to 55 (min)

Time = 55 to 75 (min)
Cont. – Operations Efficiency

GCD – TMMK M/R Process Kaizen -After Level work load

Time = 0 to 40 (min)

Time = 41 to 60 (min)

Time = 60 to 75 (min)

TM 1 & 2: Move Freight from the M/L to Set Lane

TM 2: 1) Clear freight using TMMK check sheet

TM 1: 1) Pull Tickets & Slot in Ticket Box

Benefit:
4 docks x 2 shifts = 8 t/m
$399K/yr savings

AFTER ALL FREIGHT HAS BEEN CLEARED:

TM 1: Load Truck #1

TM 2: Load Truck #2

4 docks x 2 shifts = 8 t/m
$399K/yr savings
## Logistics Workshop Results FY06

$48.6M REDUCTION YTD

<table>
<thead>
<tr>
<th>KAIZEN AREA</th>
<th>ANNUAL PLAN TARGET</th>
<th>YTD TARGET</th>
<th>CURRENT STATUS</th>
<th>EVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLANNING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Route Kaizen / Mileage Red.</td>
<td>$20.0M</td>
<td>$15M</td>
<td>$21.9M</td>
<td>○</td>
</tr>
<tr>
<td><strong>PACKAGING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reuse / Sourcing / Pkg Oper.</td>
<td>$32.1M</td>
<td>$23.5M</td>
<td>$24.7M</td>
<td>○</td>
</tr>
<tr>
<td><strong>OPERATIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossdock Kaizen</td>
<td>$3.4M</td>
<td>$2.5M</td>
<td>$2.0M</td>
<td>△</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$45.5M</td>
<td>$41.0M</td>
<td>$48.6M</td>
<td>○</td>
</tr>
</tbody>
</table>
Managing Through KPIs

• **What is a KPI**: A key performance indicator (KPI) is a quantifiable measurement that reflects the critical success factors of an organization.
Why Are They used:
To define and measure progress toward organizational goals. KPIs provide a clear picture of current condition.

• Sample KPIs:

<table>
<thead>
<tr>
<th>Project Management</th>
<th>Logistics Planning</th>
<th>Logistics Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. % PKG Re-use</td>
<td>2. Miles/veh</td>
<td>2. M3/tm</td>
</tr>
</tbody>
</table>

Keypoint:
• KPI support our pursuit to the ultimate goal
THANK YOU