Supply Chain Optimizers

Packaging Optimization

How Designing Shipping Cases to Suit the Entire Supply Chain Delivers Amazing Savings
What Do We Do?

- Utilize both sophisticated computer models and years of practical experience
- Synchronize the relationship of shipping containers, warehousing & transportation to achieve lowest total cost for clients
- Can help any company shipping in bags or corrugated boxes
- SCO is an independent service whose only goal is to make our clients more efficient
Supply Chain Premise

Efficiency is dependent on two factors:

1. **Network** – System of linking factories & distribution centers to customers

2. **Product** – Volume & physical attributes of shipping cases

- #1 is a distance issue…#2 is a density issue
- **Our optimization efforts focus on holistic supply chain impact to cut costs for clients**
Representative Client List

- Kimberly-Clark
- Canada Packers
- Rich Products
- Lillian Vernon
- Keebler
- General Electric
- Wrigley
- Stanley Works
- R G Barry
- John Deere Parts
- Nestle [8 divisions]
- A T Cross
- Office Depot
- Robin Hood Multifoods
- Church & Dwight
- Fisher Scientific
- ACCO Brands
- George Weston [10 div.]
Supply Chain Issue

- Shipping case size, strength and shape decision is typically made by:
  - Brand Management
  - Quality Control
  - Manufacturing
  - Corporate Packaging
  - Research & Development
  - Marketing
  - Corrugate Supplier
  - Plant Management

- The costs show up in Logistics which is usually not involved in this decision
Business Background

- Completed 300+ assignments over 20 years
- No direct competitors
- Much of our work has been in frozen foods but we also have experience in hard goods, giftware, soft goods, bulk products, mail order
- All of our associates have over 20 years of supply chain experience in a variety of industries
SCO Publicity

- CLM Annual Conferences
- Canadian Assoc of Logistics
- GMA Logistics Conference
- Bob Delaney’s *State of Logistics Report*

identified packaging optimization as *last major logistics opportunity* and SCO as the leader of the category
Leading Accomplishments

- #1 powdered detergent manufacturer saved $500,000 by changing shipping case orientation 1/16th inch....also generated 3 retail facings in same space as 2 previously
- #1 office products manufacturer saved $1.5 m
- #1 sanitary item company saved $2 Mil
- #1 frozen dough company saved $3 Mil
- #1 frozen snack company saved $5 Mil
Visible Benefits

• Have experienced a remarkable improvement in packaging strength, cube utilization and damage control

• Positive changes in packaging design, pallet configurations and unit load improvements

• Virtually no case fatigue or damage related to poor packaging

- EVP of 3PL partner handling Rich’s, Rosina Foods, Chef America
Rich Products Case

- Initial analysis done on 23 frozen items
- Included doughnuts, breads, creamers
- Total savings identified = $3+ million
- Project is documented in Packaging Digest as well as six other magazines and has been presented at five national conferences
Ice Cream Cookies
Original Shipping Case

• One pallet high before it crushed
• Pallet area utilization = 97%
• Pallet cube utilization = 96%
• Each pallet held 3,132 cookies
Ice Cream Cookies
New Shipping Case

• Now stackable two pallets high
• Pallet area utilization = 100%
• Pallet cube utilization = 95%
• Each pallet now holds 4,212 cookies

34% increase in product per pallet
Associated Cost Reduction
On Ice Cream Cookies

Packaging 33%
Freight 20%
Warehousing 25%

Permanent Annual Saving 23%
Restaurant Salad Dressing

- All competitors use a one gallon container and pack 4 in each case
- Market leader has optimized its packaging and gained the following advantage:
  - 14% less material in shipping case
  - 16% lower handling cost
  - 33% lower storage cost
Success Factors

• We know how the supply chain impacts corrugated boxes

• We also know how corrugated box size, strength, stacking specs and damage impact the supply chain

• We are the only company in North America that optimizes supply chains through packaging
Box Efficiency

• Most economical box has ratio of $L_2 - W_1 - D_2$

• Example: $10 \times 5 \times 10 = 500 \text{ cu in}$
  $25 \times 5 \times 4 = 500 \text{ cu in}$

• Box #2 uses 20% more corrugated

• There are more than 10 different ways to construct a box....each impacts cost differently
## Impact of Pallet Patterns

<table>
<thead>
<tr>
<th>Interlock?</th>
<th>Overhang?</th>
<th>Box Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>100%</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>68%</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>55%</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>51%</td>
</tr>
</tbody>
</table>
Stacking Strength

• Interlocked pattern gives better stability but 40% less compression strength than column stacking.

• 75% of box compression strength is located in 4 corners of container.

• One inch misalignment of box corners reduces compression strength by 43%.
Impact of Storage Time

0 Days = Full Strength
1-4 Days = 70%
Up to 11 Days = 65%
Up to 31 Days = 60%
Up to 101 Days = 55%
Up to 1000 Days = 50%

This is in normal ambient temperature warehouse
# Impact of Humidity

<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>Box Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>110%</td>
</tr>
<tr>
<td>55%</td>
<td>100%</td>
</tr>
<tr>
<td>65%</td>
<td>90%</td>
</tr>
<tr>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>85%</td>
<td>70%</td>
</tr>
<tr>
<td>100%</td>
<td>50%</td>
</tr>
</tbody>
</table>
Corrugated Box Supplier

- Make their revenue from total material they sell to users.
  ....the more corrugated a customer uses the more money a supplier makes.
- They understand construction of corrugated boxes.
  ....little or no knowledge of supply chain costs, issues, tradeoffs.
Performance Guaranteed

• We will analyze your logistics processes on site so that we can identify changes that work in your system and save you money

• Client actual costs drive the process

• 90 days to implementation is typical

• Client pays no money upfront...we get paid from savings so *if there are none...your cost = 0*
Credentials

• SCO is staffed with experienced logistics executives who understand transportation & warehousing as well as their cost drivers

• We always outperform those focused only on packaging because we see the big picture

• *We deliver big results...our clients and their customers both get improved logistics efficiency and reduced damage*
**Grocery Unsaleables**

**Joint FDI-FMI-GMA Study**

- $2.57B in ’03 [1.11% of sales]
- 58% [$1.5B] is damage due to inadequate packaging - handling – logistics practices
- **Recommendation**: Focus on manufacturing packaging & logistics practices to account for total supply chain from plant to shopping cart

…. best performers focus on both packaging & logistics for maximum benefit
Summary

• SCO is the only company in North America that specializes in SC optimization thru packaging
• We have an outstanding track record with 300+ clients over 20 years
• We guarantee results that work for client
• Our work pays for itself and clients start pocketing savings within 90 days
• *SCO gets paid from a share of first year savings….client gets 100% of all subsequent benefit*
# Sam’s Cinnamon Rolls

<table>
<thead>
<tr>
<th></th>
<th>Original Case</th>
<th>Revised Case</th>
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</thead>
<tbody>
<tr>
<td>Cube</td>
<td>.928</td>
<td>.800</td>
</tr>
<tr>
<td>Void</td>
<td>28%</td>
<td>10%</td>
</tr>
<tr>
<td>Logistics cost/case</td>
<td>$1.57</td>
<td>$1.23</td>
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<tr>
<td>30 day box strength</td>
<td>230 lbs</td>
<td>328 lbs</td>
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</table>

*Logistics cost: -22%  Box strength: +43%*
Disposable Diapers

- Packaging cost reduction 15%
- Warehousing cost reduction
  - both labor & space 33%
- Freight 21%
- Total improvement: 21% worth $943K

*this was on only 3 product codes*
Maternity Sample Kit
[$1 million+ in material saving]

**One Can Box**
- 200% increase in cases per pallet
- $283K in material
- Density increases 295% 
  [from 4.08 lbs per cu. ft. to 12.06 lbs]

**Two Can Box**
- 65% increase in cases per pallet
- $763K in material
- Density increases 166% 
  [from 8.17 lbs per cu. ft. to 13.6 lbs]

*full savings impact........totaled over $3 million*
Designer Sandals
Imported from Asia

- 64% reduction in packaging cost
  - From $1271/M to $454/M
- 40% improvement in freight cost
- 40% improvement in warehousing cost
- 47% total cost reduction
  - $204K on $434K base

...customer gets 66% more product on each ocean container from Asia
Surgical Room Kits

• 9,000 product codes
• Internal team of 2 industrial engineers, 2 packaging interns & new software generated greatly improved results
• SCO analyzed 2 optimized items
  - item 1 had additional 20% cost reduction
  - item 2 had additional 8% cost reduction after increasing packaging spend by 12%