Returnable/Reusable Corrugated Containers
Returnable Containers
Returnable Containers

- Pallet Bins, Milk Crates, Beverage Trays, Totes
  - Almost all Constructed of Plastic, Metal, or Wire
Returnable Containers

• Corrugated Containers have a History of Being Effective Returnable Containers in the Right Applications
Modular/Reusable Corrugated Containers

• Topics for Discussion
  – Advantages that Corrugated Containers Have Over Other Materials in a Returnable Application
  – Typical Product Applications and What Products to Avoid for Returnable Corrugated Containers
  – Challenges To Overcome In Converting From One-Way to Returnable Corrugated Container Systems
  – Traditional RCC Applications
  – New Generation of Engineered RCC Applications
    • Bulk Applications
    • Potential Tote Applications
Why Corrugated As a Returnable?

• RCC’s Offer a Number of Advantages to the User.

• Reduced Costs
  – Reduce packaging material costs through multiple uses
    • Versus expendable packaging

  • Potentially offer advantages when compared to returnable containers constructed of other materials

  – Lower Initial Costs compared to other returnable container materials
    • RCCs Can Serve as Initial Test For Returnable Applications
RCC Advantages

• Lower Replacement Costs
  – Through Attrition
  – Better able to make size changes as needed
    – Lower Tooling Costs

Cutting dies vs. injection molds
RCC Advantages

- Lower Replacement Costs
  - Reduced Potential of Loss From Theft or Misuse
    - Corrugated Containers Less Desirable by other parties
  - Lower Replacement Costs
RCC Advantages

• Optimized cube efficiency
  – Compared to Nestable, inclined wall containers
    • Between 25% and 40% better cube efficiency
    • Better Cube Efficiency in a Knocked Down Flat form
Cubic Loss And Cost Calculation Example

Trailer Size: 48' X 102" X 110"
Pallets: 48” X 45” – Custom Automotive Size
24 Pallet Positions Per Trailer
Stacked 2 Pallets High - Total 48 Pallets
Cubic Loss And Cost Calculations
Example #1 - Standard 1/16 Reusable Container

O.D. - 11 13/16” X 10 7/8” X 7 7/16”
O.D. Cube: .520 Cubic Ft
I.D. Cube .265 Cubic Ft
Loss: .255 Cubic Feet - 49%

Container: - Palletizes 16 Per Layer,
7 High = 112 /pallet, 5376 Per
Trailer
Product Weight: 5 Pounds Per
Container, 560#/ Pallet, 26,880#/Trailer

At a Profit of $.10 Per Pound
  = $.50 Per Container, $56 Per
    Pallet, $2688 Per Trailer
Cubic Loss And Cost Calculations

Example #2 – Auto Bottom - C Flute Container
O.D.: 11 13/16” X 10 7/8” X 7”
O.D. Cube: .520 Cubic Ft.
I.D. Cube: .443 Cubic Ft.
Loss: .077 Cubic Feet - 15%
Cubic Loss And Cost Calculations

O.D. Box Size to Match Usable Returnable Volume: 11-13/16” X 10 7/8” X 4 7/16”

Box: Palletizes 16 Per Layer, 11 High = 176 Containers/ Pallet, = 8448 Per Trailer

Product Weight: 5 Pounds Per Container = 880 Per Pallet = 42,240# per Trailer

At a Profit of $.10 Per Pound
= $.50 Per Container = $88 Per Pallet = $4224 Per Trailer
= 37% Increase Cube Efficiency & Profit Potential
RCC Advantages

• Reduced package to product weight ratio
  – Metal, wire, plastic typically weigh more
  – Reduced package to product ratio with Corrugated

• Typically lighter weight Corrugated
  – Ergonomic benefit = reduced worker stress
RCC Advantages

- Generally Easier to Dispose after useful life
  - Landfilling should not need to be an option
- Renewable Resource Cycle
  - Corrugated Part of the Normal Waste Stream
  - Recycling Logistics Already Exist
  - Recycling benefit = $$$$$
RCC Challenges

• Not Appropriate For All Products
  – Cold Chain Distribution Chains present Significant Problems
    • Meat Products
    • Produce
  – Heavy Products with Sharp Edges
    • Easily damage RCC container material
  – Dirt or Contaminate Sensitive Products
    • Washing of Containers not an Option
    • Some Applications Specialized Coatings or Expendable Liners may have application
      – = added $$$ for materials
      – May increase labor costs
RCC Challenges

• Durability of RCCs
  – Corrugated is Not As Strong or as Durable as Plastic, Wire, or Metal
  • Need to Balance a Number of Complex Issues Against Other Returnable Options or One Way Packages
    – Returnable Process Return Percentage
      » Frito Lay – other distribution channels
    – Back Haul Distances and Cost of Return
    – Expected Life vs. Replacement Costs
RCC Requirements For Success

• Typically have the same challenges as Other Materials

• Must Have Commitment To A Returnable Program
  – Usually Requires Cultural Change with the Involved Parties
    • Processor / Packer
    • Customers
    • Other Users within the Supply Chain
  
  – Top To Bottom Understanding & Buy In of Program Goals
    • Endorsements, Incentives, Peer Pressure

• Parties Must View The Package Differently
  • No Longer Just a Container – Now an Asset
  • Handle, Transport, Store Differently for Longevity
RCC Requirements For Success

• Design & Specification Considerations
  – Process to Monitor Program Success and Make Revisions Suggested

• What is Expected Regarding Container Performance?
  – Desired Condition of Container Contents Through Use Cycle
  – Overall Rating Use of Container
    • Ergonomics Issues
      – Handles, Knock Down & Set Up Features, Weight
    • Convenience of Use To All Parties

• What Does The Entire Distribution Cycle Look Like?
  – Do You really know what the present expendable package goes through?
  – Information Critical to Develop Specifications for Strength & Durability
Do You Really Know Your Distribution Challenges?
The Use Cycle

• At The Supplier
  – Incoming Materials Dock
  – Transfer to Storage
  – Storage Environment
  – Transfer to Pack Line
  – Pack Product
  – Unitize Packed Product
  – Transfer to Dock
  – Load onto Trailers
    • Pallet Jack or Fork Truck
The Use Cycle

• Transportation Factors

• Leg – Supplier to User
  – Distance
  – Road Conditions
  – Load Integrity
  – Pallet Condition
  – Performance Factors
    • Single Layer or Double Stacked Pallets
    • Stretch wrapped (totes)
  – Offload at User’s Dock
The Use Cycle

- At The User
  - Offload at Incoming Materials Dock
  - Immediate Use or Put Away in Incoming Materials Storage
  - Transfer to Work Stations
  - Type of Use – critical
    - Bulk vs. Tote, Nest vs. straight walled vs. Knock Down
  - Collation and Unitization of Empties
  - Transfer to Empty Staging/Storage
  - Transfer to Loading Dock
  - Transfer Onto Return Transportation
The Use Cycle

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Full Disclosure Software

• Comprehensive Model Cost Building Software designed to Compare the Total Cycle Costs between One Way and Returnable Packaging

  – Fiber Box Association

  – Weybridge Associates
Comprehensive Costing at Every Point in System:
1. Handling
2. Loading/unloading
3. Storage
4. Shrinkage/damage
5. Capital (if any)
6. Other impacts

Capture Supply Chain
Full Disclosure Version 1.3 Training

Comprehensive Costing at Every Point in System
1. Handling
2. Loading/unloading
3. Storage
4. Shrinkage/damage
5. Capital (if any)
6. Other impacts

![Diagram of supply chain network with nodes labeled Factory, Distribution Point 1, Trucking Segment 1, Distribution Point 2, Distribution Center 1, Distribution Point 3, Distribution Center 2, Distribution Point 4, Store, Trucking Segment 2, Trucking Segment 3, Trucking Segment 4, Trucking Segment 5, Trucking Segment 6, Trucking Segment 7, Container Depot, Dry Goods, RPC Depot, and Retail Store, Dry Goods.]

RPC Return System
Comprehensive Costing on Every Transport Segment

1. Transit time
2. Standing time
3. Cost per mile, per hour, or per trip
4. Loading efficiency

Each valid segment.

- Trucking Segment 1: Manufacturer, Dry Goods (FBA) to Distribution Center
- Distribution Point 1: Manufacturer, Dry Goods
- Factory
- Trucking Segment 7: n/a
- Distribution Point 7
- Trucking Segment 6: Container Depot, Dry Goods (FBA) to Manufacturer, Dry
- Distribution Point 6: Container Depot, Dry
- RPC Depot
- Trucking Segment 5: n/a
- Distribution Point 5
- Trucking Segment 2: n/a
- Distribution Center, Dry
- Distribution Point 3: Distribution Center, Dry Goods (FBA) to Retail Store, Dry
- Trucking Segment 3: Distribution Center, Dry Goods (FBA) to Retail Store, Dry
- Distribution Point 4: Retail Store, Dry Goods
- Trucking Segment 4: Retail Store, Dry Goods (FBA) to Container Depot
- RPC Return System
# Detailed Cost Comparisons

## Expendable vs. Returnable

### Summary Cost Comparison

<table>
<thead>
<tr>
<th></th>
<th>Corrugated Containers</th>
<th>Reusable Plastic Containers</th>
<th>Variance</th>
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<tbody>
<tr>
<td><strong>Annual Container Cost</strong></td>
<td>$673,500</td>
<td>$156,570</td>
<td>-$516,930</td>
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<td><strong>Annual Label Cost</strong></td>
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<td><strong>CC Trucking Costs</strong></td>
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<td><strong>CC Handling Costs</strong></td>
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<td><strong>CC Operating Impacts</strong></td>
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<td>$0</td>
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<tr>
<td><strong>CC Disposal Cost (or Recycling Value)</strong></td>
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<td><strong>CC Inventory Value</strong></td>
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<tr>
<td><strong>CC Inventory Interest Cost</strong></td>
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<tr>
<td><strong>Annual CC Cost</strong></td>
<td>$2,633,499</td>
<td>$3,322,442</td>
<td>$688,943</td>
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</tbody>
</table>

### Detailed Cost Components

- **CC Trucking Costs**: Total trucking costs include trucking and any standing costs at unloading and loading.
- **CC Handling Costs**: Total handling costs include unloading, handling, and loading.
- **CC Operating Impacts**: Operating impacts are detailed at various distribution points.
- **CC Disposal Cost (or Recycling Value)**: The difference between disposal costs and recycling value.
- **CC Inventory Value**: The value of inventory.
- **CC Inventory Interest Cost**: The cost associated with inventory interest.

### Bottom Line Comparison

- **Annual RPC Cost**: $3,322,442
- **Variance after RPC Amortization**: $497,195
Evaluate Use Cycle

- What Are The Critical Negative Elements Effecting Performance or Durability?
  - Workstation
  - Package Unitization and Pallet Integrity
  - Handling Practices
  - Storage
  - Transportation
  - Worker Practices

- Which Can Be Changed To Reduce Negative Impacts on Package Performance
Specification Development

• Based on
  – Critical Elements Of Distribution Cycle
  – Desired Performance of Container and Contents
  – Desired Number of Trips to Justify Container Use

• Balance Between
  – Cost of Materials
  – Minimum Number of Uses – Performance
  – Loss Issues
    • Cost to Upgrade vs. Recognized System Loss Percentages
Examples Of Traditional RCC Applications

- Snack Foods
- Warehouse Replenishment
- Postal Service
- WIP Totes
Snack Food Applications

• Snack Foods
  – Typically Lightweight Products
  – Cubic Containers – Some Footprint Standardization
    • Size Specific, but Not Design
  – Closed Loop Delivery System
    • Route drivers – regular delivery schedule
    • Maintain control of packages through the cycle

• Returns usually in the 4 to 8 cycle ranges
• Some Losses through Palletized Distribution Channels
Snack Food Examples

• Utz Quality Snacks
  – Drivers receive small credit for each container returned
Snack Food Examples

- **Frito – Lay**
  - Both Route Driver and Palletized Distribution Channels
  - Average Just over 5 trips per container
  - Balance - Material Strength/$ vs. Return %
Warehouse Replenishment Applications

• Warehouse Applications
  – Broken Case Quantity Deliveries
  – Seasonal Product Set Up Deliveries
  – May be the Primary Replenishment Container

• Greater Weight Variations
  – Broader Array of Products
  – Cubic Containers – Some Footprint Standardization
    • Single vs. Multiple Sizes
    • Greater Design Variations
Warehouse Replenishment Applications

• Typically Closed Loop Delivery Systems
  – Between D/C and Specific Stores – regular and sometimes daily delivery schedule
  – Success is dependent on maintaining control of packages through the cycle

• Returnable Life usually in the 4 to 8 cycle ranges

• Losses Typically Occur Due to Poor Top to Bottom Commitment and Worker Education
Warehouse Replenishment Examples

• Wal*Mart – Automatic Bottom Design
  – Corrugated and Plastic Corrugated
  – Associates encouraged proper handling and return through box print
Warehouse Replenishment Examples

• Kohl’s & Sports Authority
  – Single Size - three piece tote
  – Knock Down Capable
U.S. Postal Service

• Used for Transference of Mail Between Hubs
  – Corrugated Tray and Sleeve
  – Plastic Corrugated Also Used
Other Examples of RCC Container/ Tote Designs

• Collapsible Bliss Container
Other Examples of Typical RCC Container/ Tote Designs

• Die Cut Containers with Snap Lock or Tuck Lock Features
Next Generation of Engineered RCC Package Designs

• Engineered Structures and Improved Materials
  – Enhance Performance & Durability

• Many Designed For Specific Market or Product Needs

• Existing and Potential Opportunities
  – Bulk Applications
  – Hand Held Tote Applications
Bulk Applications
ReBULK

• Robust Bulk Handling System
  – Ideal for Flowable Solids
Peanut Industry Success

• Cost Effective Returnable System Desired
  – Reduce Material Waste and Labor Costs Associated with Clean Up of Expendable System

• Engineered Design
  – Added Horizontal Panels to Minimize Bulge
    • Allow use on automated dumping equipment
  – Bellows Bottom
    • Facilitates knock down for return
    • Reduces paper tear risk – extend life
  – Un-Slotted Top Flanges – Forms Robust Collar – extends life

  – Sanitation – Poly Propylene Bag
    • Allows peanuts to breathe
    • Prevents product contamination from multiple trips
Peanut Industry Success

• Distribution Cycle
  – Sheller – packed with nuts
  – Delivered to Processor
    • Storage, Processing, Knock Down
  – Return to Sheller

• Minimum 10 Trips per Container
  – $150/one way – vs. $40/ returnable
Engineered Returnable and One Way Bulk Handling System
Pallet Pack
Pallet Pack: *Features & Benefits*

- Engineered Features and Advantages
  - Collapsible Bulk Box w/lid & Corrugated or Composite Shipping Platform
Pallet Pack: Features & Benefits

- Completely customizable
  - Material combinations for specific distribution needs
  - Graphics/text clearly printed on all sides
  - Plastic cores/bottom decks available for severe environments
Pallet Pack: Features & Benefits

• Ergonomically friendly – easy to set up and knock down for storage, reshipping, and reuse
  – Lightweight corrugated materials makes for easier handling
Pallet Pack: Features & Benefits

– Attached to Corrugated Shipping Platform
  • True four-way entry
  • Easily handled with forklift & pallet jack equipment
Pallet Pack: Features & Benefits

- Compatible with conveyor systems and material handling equipment for greater efficiency and cost savings
- USDA approved
Pallet Pack: *Features & Benefits*

- Collapsible - Saves Storage Space & Minimizes Backhaul Costs
Pallet Pack: Features & Benefits

• Flexibility For Use by The Customer –
  – One Design Satisfies 2 Needs
    • Reusable – reduce costs and waste – 6 to 12 turns
    • One Way – when return costs are too expensive or impractical
Recycling - *Closing the Loop*

- Environmentally friendly – Pallet Pack is 100% recyclable...and made from 100% recyclable fiber!
D.O.D.

• Major Customer – Categorized as a “Critical Need Product”
  – Cannot Run Out of Stock
  – Used By Supply Depots - Supply All Commissaries and Bases with Bulk Shipments of a Variety of Products
  – Used in Both Returnable and One Way Applications
    • Determined by distance and practicality
• Supply Depot Use
Pallet Pack Set Up Accomplished in Seconds
Pallet Pack KD Process Similar as Set Up
• Packing & Handling
• Unitization & Outbound Shipment Preparation
  – Destinations have included Afghanistan & Kuwait
Other Markets for Pallet Pack

• Automotive – U.S. to Europe Shipments

• United Nations Acceptance
  – Pine Nematode
  – Asian Long Horn Beetle

• Largely One-Way Shipments
RCC - Structurally Enhanced Tote Opportunities
Trends in Manufacturing Creating Opportunities for Returnables

• **Material Handling Management** - “Are Reusable Containers Worth The Cost?”

  – Evolution of returnable containers to improve manufacturing efficiencies

  – Move away from multi-layer bulk packs
    • **Reduce container size = limits part quantities**
      – reduce inventory carried at the line
      – reduce space requirements at the line
      – weight limit issues

  • **Improve part access and orientation**
    – Minimize searching for parts between layer pads
    – easy access and removal by workers
Increased Use of Straight Walled, Open Top Containers

• Container collapsibility or nesting no longer a critical requirement in many Distribution Channels
  – Milk Run distribution loops
  – Desire to Maximize container cube efficiency/ Minimize size
  – Maximize worker access capabilities

• “Automotive manufacturers are looking to deliver the minimum amount of inventory to the right spot on the assembly line and hand held containers are the way to do it.”
Standardized Returnable Corrugated Totes Could Provide Many Of These Functions
Standardized Returnable Corrugated Totes Could Provide Many Of These Functions

- From This
Standardized Corrugated Totes Can Provide Many Of These Functions

• To Something Like This
Sizes and Constructions

• Flexibility In Both Standard Container Size and Materials
Enhanced Engineering Of Design Options

• Many Corrugated Designs Provide Substantial Strength Characteristics
  – Use of Heavier Weight Materials Can Prolong Longevity

• Three Levels of Supply for These Containers
  – Corrugated Supplier
  – Packer User
  – Third Party Logistics Provider
Potential Sources Of Supply

• Corrugated Container Plant Level
  – Niche item - local supplier with automotive/manufacturing supplier facility
  – Provide finished returnables of selected sizes and constructions to user

• “On-Site” RCC conversion
  – Bring erecting machinery into manufacturing facility
    • Conversion on an as needed basis
    • Machinery Investment vs. Cost Control

• Third Party Logistics Provider
  – Containers now an asset that can be effectively managed
Hand Fold Design Options – Hinged Tab Fold Over
Hand Fold Design Options – Hinged Tab Fold Over
Hand Fold Design Options – Hinged Tab Fold Over
Hand Fold Design Options – Knock Down
Machine Erected - Design Candidates

- PLAFORM
- Flush End
- DEFOR/ One Touch/ Curved Corner
- Showcase

- All Can Be Engineered with a Range of Materials and Constructions
- Machinery Formed Designs
  - Improved Strength and Durability
Hinged Tab – Fold Over Tray
P-84 Tray

- L Stack Tabs provide 4 sided stability
Bellows Bottom Tray
Bliss Box – Bellows Bottom
• Removable or permanent dunnage
  – Provide protection and product orientation
    • Foam, chipboard, solid fiber, corrugated, plastic corrugated, poly film

• Label Placards
  – Permanent and Single Use
    • Permanent License Plates
    • Single Use – Easy to Remove Labels
  – Kennedy Group – Potential Source
Kennedy Group - Patented Placard Label Holder
Allows for easy removal & replacement of labels

- Prevents mislabeled/misidentified containers improving productivity.

- No more scraping labels which reduces labor cost.

- Efficient way to accurately identify, track and manage reusable packaging

- Containers can be easily stacked and nested without labels falling off.

- Can be used with virtually any label.
Kennedy Group - Patented Placard Label Holder
Works with Fiber Based Packaging As Well

- Fiber Drums & Corrugate Boxes
Standard Placard Sizes & Options

- 3" x 5"
- 4.5" x 6.5"
- 4.5" x 7.875"
- 6" x 8"
- 8" x 10"
- 14.25" x 10.25"

- Blank
- Printed – “Place Label Here”
- Custom
Subsidiary Items

• Graphics
  – Customer specific printing
  – Solid color or specific printing
  – Plain kraft

  – RFID capabilities
    • Continuing evolution
      – chip & label combinations
      – conductive inks
Opportunities for Next Generation RCC Totes

• Lighter Weight Products
  – Plastic parts
  – Plastic part assemblies
  – Interior moldings
  – Lightweight & Medium weight fasteners
  – Work in Process Containers – “In House” movement

• With the Evolution of Design Constructions and Materials
  – Broaden the scope of application
    • connectors/ wiring harnesses, etc.
    • Variety of other products and industry applications
Set Up Machinery Videos
Boix
Summary

- Returnable Corrugated Containers can be an effective alternative to RPCs in a number of Markets

- In the right application, corrugated designs can provide multiple returns/uses at a substantially reduced cost compared to expendable packaging.

- Effectively implementing an RCC program may require significant time and effort on the part of the box plant team or company.
  
  - The question is whether the business at Risk is worth the effort?

- Corrugated Returnable Containers have a long history of success in a number of markets. Your efforts to expand upon these successes will dictate expanded use in the future.
Thank You For Your Time!